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PART SECOND.—Bibliographical Notices.

Part Third.—Original Reports and Memoirs.

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MEDICAL REVIEW,

FOR JANUARY, 1844.

PART FIRST.

Analytical and Critical Reviews.

ART. I.

1. *A Treatise on Food and Diet, with Observations on the Dietetical Regimen suited for Disordered States of the Digestive Organs; and an Account of the Dietaries of some of the principal Metropolitan and other Establishments for Paupers, Lunatics, Criminals, Children, the Sick, &c.* By JONATHAN PEREIRA, M.D. F.R.S. & L.S.—*London*, 1843. 8vo, pp. 542.
2. *A Treatise on Diet, comprising the Natural History, Properties, Composition, Adulterations, and Uses of the Vegetables, Animals, Fishes, &c. used as Food.* By WILLIAM DAVIDSON, M.D. M.R.C.S.E.—*London*, 1843. 12mo, pp. 383.
3. *Food, and its Influence on Health and Disease, or an Account of the Effects of different kinds of Aliment on the Human Body. With Dietetic Rules for the Preservation of the Health.* By MATTHEW TRUMAN, M.D.—*London*, 1842. 12mo, pp. 240.

THE works placed at the head of this article, taken collectively, profess to comprise the entire subject of diet. While examining them, we shall endeavour to ascertain the progress that has been made in the attainment of correct principles of dietetics; for it may be affirmed that such principles are still a great desideratum in medical practice. As a collateral object, we have it in view to illustrate the importance to mankind of every step gained in this inquiry, not only in a physical and hygienic, but in an intellectual, moral, and religious point of view.

Dr. Pereira's treatise is unquestionably the earliest attempt that has been made, in this country at least, to place the general subject of dietetics upon a strictly scientific basis. Accordingly, in the present article we shall follow his arrangement, and avail ourselves of many of his valuable suggestions as we proceed. Chemistry in its present state, and especially the organic chemistry of Prout and Liebig, is made by far more available in elucidating the question of diet by this physician than by any writer who has preceded him. He abandons the ordinary method

of arranging foods according to the proximate principle which happens to predominate in their composition, and adopts one of a more scientific character, partly from Tiedemann, and partly original. Under the term "Food" Dr. Pereira comprises not only solids, to which the word "Aliment" has frequently been restricted, but also Fluids and Condiments. The work is divided into two parts, the first treating of "the substances employed by man as food;" the second of "the adaptation of aliment to the different wants and conditions of human existence."

I. OF FOODS.

This part is divided into three chapters, and comprises an account of the chemical elements of food; of alimentary principles, as oil, sugar, protein or fibrin, which are compounds of two, three, four, or more undecompounded bodies; and of compound aliments, as the flesh of animals, vegetables, wheat flour, &c., which are frequently composed of many alimentary principles: each of these divisions requires a special exposition.

I. ELEMENTS OF FOOD. This chapter contains numerous chemical details of the highest importance, introduced by Dr. Pereira for the first time into a systematic treatise on diet. They are chiefly derived from the recent productions of Boussingault, Liebig, Payen, and Dumas. Physiologists variously estimate the number of elements which enter into the human body as essential constituents; with Dr. Prout, the author assumes it to be thirteen. These are all derived from the food.

1. *Carbon.* This is an essential constituent of every living tissue, and it ultimately serves as fuel for combustion, and the production of animal heat. More or less appears to be required by the system, not so much for the purposes of nutrition, but, according to the varying circumstances of the production of heat, in states of exertion or rest for instance; or according to external temperature as determined by season, climate, the state of the atmosphere, and we may add clothing. It is derived from the food, as a component part of the different alimentary principles, in proportions varying from about 34 to 78 per cent., the smaller proportions being contained in certain vegetables, and the largest quantity in oils and fats. Dr. Pereira shows by calculation that the chemical changes effected upon the carbon received into the system are nearly, if not quite, sufficient to explain the animal temperature.

2. *Hydrogen.* This also, as an element of the organized tissues, is an essential constituent of food. Where it occurs in the relative proportion to oxygen, which is necessary to constitute water, as in starch and sugar, the substances are regarded as hydrates of carbon, and they yield the latter element only, to combine with oxygen in the system. For this reason the quantity of oxygen inspired by graminivorous animals, is equivalent to the carbonic acid expired, no oxygen being required for the combustion of hydrogen. When the hydrogen is in excess, as in fat, alcohol, protein, and gelatin, whatever intermediate forms the food may assume in the animal solids or fluids, not only is its carbon converted by combustion into carbonic acid, but its excess of hydrogen is converted into water. So that in carnivorous animals, which consume a large quantity of super-hydrogenous food, a larger quantity of oxygen is inspired than of carbonic acid expired, this being an additional source of animal heat. When the hydrogen is deficient in an alimentary substance,

as in citric and tartaric acid, all the hydrogen and part of the carbon being already in combination with oxygen, none of the first element, and probably a part only of the second, can be available as fuel for animal combustion.

3. *Oxygen.* This element is a constituent of the more essential parts of the vital tissues, and accordingly of food. In the latter it bears a proportion varying from 10 to 140 parts, combined with 120 parts of carbon. Those foods—as fat and proteinized substances—which contain a small proportion of oxygen, must require a larger quantity of respired air for their combustion, than those—as sugar and starch—which contain a larger proportion of oxygen. The latter produce less heat than the former. Hence the quality of the food as respects its elements, and the activity of respiration, reciprocally influence each other; theory in this instance confirming and explaining the results of experience. Oxygen has an interest of the highest importance, distinct from that of food. As vital air it is the supporter of combustion, and of that degree of heat without which no vital action can continue; its ultimate effects being at the same time destructive, consuming the greater number of the products of vital action; but it does not appear that the oxygen of the food is employed in the system for these purposes. The consumption of atmospheric oxygen, and the heat produced, is greater from a diet of animal principles than from an equal quantity of vegetable matter; it is increased by the use of spirituous liquors, the alcohol of which contains no oxygen.

4. *Nitrogen.* This is also an essential constituent of every vital tissue. Many of the most important alimentary substances are destitute of it; hence the distinction of food, so much insisted upon by Liebig, into nitrogenized, as fibrin and albumen, and non-nitrogenized, as sugar and starch; and it being held that the former only can nourish the vital tissues, while the latter are wholly or in part burned; the former have been called "plastic elements of nutrition," and the latter "elements of respiration." Nitrogen is a constituent of the food of the embryo chick and of the young mammal. The various nitrogenized substances in vegetable as well as animal food contain from 14 to 18 per cent., or proportions nearly identical with those of the tissues which they serve to nourish. Food in its complicated state contains from about 1·3, as in rice, to 15 or 18 per cent. as in albumen or gelatin. It has been assumed that the quantity of nitrogen is a measure of the nutritive value of food, and Dr. Pereira gives Boussingault's scale of nutritive equivalents constructed upon this principle.

5. *Phosphorus* is a component part of bones, nerves, muscles, and other parts of the living body, and of course a necessary element of the food of animals. It is a constituent of the yelk of eggs and of milk, and of the greater part of the animal food employed by man. It is also abundant in vegetable food, in the forms of phosphates of ammonia, lime, or magnesia. More phosphorus is supplied to the body under ordinary diet than its wants require, the excess being eliminated in the urine or solid excrements; but some vegetable aliments, as beans and peas, are remarkably deficient in this element.

6. *Sulphur* is again an essential constituent of various tissues, as of fibrine, hair, and bones, and must be received into the system with the food. The nitrogenized alimentary principles of vegetables, also eggs and milk, water (in the form of sulphate of lime), and numerous compound

aliments, contain it. It is eliminated from the system in the urine as sulphates, partly formed by the action of the oxygen of arterial blood on the sulphur of the metamorphosed tissues.

7. *Iron.* This element is found invariably in the blood-corpuscles, although according to Scherer it is neither essential to hematosin nor necessary to the colour of the blood. Its quantity is about two parts in the thousand, varying in individuals of different temperaments and in different states of health. It is a constituent also of hair. Many articles of food contain iron, as yelk of egg, milk, mustard, potatoes, peas, &c.; but having been found in the gastric juice of the dog and in the chyle, Dr. Pereira regards this as an explanation of how it gets into the blood. Excepting the hair, no account is given of an outlet or organ of waste for this metal.

8. *Chlorine* is a constituent of blood, and of various secretions and excretions as a compound of sodium; and of the gastric juice as a compound of hydrogen. It is indispensable to health, and is constantly passing out of the system with the secretions, hence it requires to be constantly renewed, and forms an essential part of food in every period of life, being a constituent of milk and both of the yelk and white of egg.

9. *Sodium* is an essential constituent of blood, of the solids, of the secretions, and especially of bile. It is furnished by most animal foods, but not by all the vegetables usually employed;—is for the most part taken with the food as a condiment, and received into the system in the form of hydro-chlorate of soda, passing out of it again by the urine in the same form, and also in flesh-eating animals, as sulphate and phosphate of soda.

10. *Calcium.* This is a component part of all animals, and particularly of their shells, crusts, and bones; also of most of the solids, and of blood, occurring in the form of subphosphate of lime. It is introduced with the food as a constituent of white and yelk of egg, of cereal grains and onions as a subphosphate, of rhuburb as an oxalate, of grapes as a tartrate, &c. Gum and unrefined sugar also yield calcium. Most animal foods contain it, and the water we drink contains its sulphate and bicarbonate. Yet the system appears occasionally to suffer from a deficient supply of calcium.

11. *Magnesium* occurs, combined with oxygen and phosphoric acid, and often with ammonia, in minute quantities in various animal structures, as blood, teeth, bones, and nervous matter. It is a constituent of both animal and vegetable food, as of cereal grains, potatoes, eggs, and flesh.

12. *Potassium.* A similar statement may be made of this element; it is required for the blood, and for the formation both of the solids and secretions, being a component part of most plants employed as food which grow inland. Of grapes and potatoes for instance. It is also contained in minute portions in common salt.

13. *Fluorine.* It may be remarked here that the statement by Berzelius, that fluorine is a constituent of bones and teeth is confirmed by Marchand. Dr. G. Owen Rees affirms, on the contrary, with Fourcroy and Vauquelin, that no such substance exists in the animal body. It has never been detected in plants, and the source of it, as an element of food, is unknown.

The above enumeration of the elements of matter required for the nutrition of the human body, must be taken conventionally, for it is well known that others have been detected. Copper in milk, sweat, and in

the intestines, and manganese constantly in the hair, as also in biliary and urinary concretions, and in the opaque lens, for instance. The account given of their origin is tolerably satisfactory, and were it not that chemical research has developed facts not easily explained, on the assumption that food is the sole source of the material fabric, it would be quite so. The first remark that suggests itself, on carefully considering this part of the subject, refers to the question, whether the vital force is capable of forming and decomposing what are regarded as the elements of matter. Dr. Prout threw out a hint, as early as 1822, that such a circumstance may happen, from considering the quantity of earthy matter contained in the skeleton of the chick. More recently he has stated his belief in the possession of this power by living systems under certain extraordinary circumstances. But with all deference to so high an authority, it is difficult to think otherwise than that, if calcium be actually formed in the chick, it must be in accordance with some general law of nature, and not an extraordinary or incidental event. If azote or carbon be decomposed by the vital force, such decomposition must occur constantly to answer certain ends in the animal economy. All the recent discoveries in animal chemistry tend to explain the origin ab externo, not only of the elements but even of many of the compounds detected in the animal tissues, and no new fact has been developed to confirm Dr. Prout's notion. Dr. Pereira is accordingly warranted in assuming that the calcium found in the skeleton of the chick is derived from one or more of the constituent parts of the egg, and that the elements detected by analysis in the various parts and products of animals have an external origin.

Another point, of even greater importance than the former, is the question whether these elements are received into the system, to become a part of the vital structures, otherwise than as aliment, and by the digestive organs. Liebig is a high authority on the negative side of this question, which has been most discussed in reference to the origin of the nitrogen. In this country there appears to be a strong opinion among practical chemists and physiologists, that, at all events when the food with which animals are fed, is deficient in nitrogen, this element becomes absorbed in the lungs. Dr. Prout suggests also, in the last edition of his work, that atmospheric air involved during mastication is a source of azote to vegetable feeders, and contributes to the formation of azotized compounds in the alimentary canal. (p. 504.) The principal arguments employed by Liebig, in favour of his view of the case, are briefly these: nitrogen is not created in the system, nor have we any satisfactory evidence that it is absorbed from the atmosphere in the vital process; the food of all animals contains nitrogenized compounds, identical in composition with the principal constituents of the blood and organized tissues, and therefore, substances devoid of this element are not required for the production of these constituents; the quantity of the nitrogenized principles of food consumed is amply sufficient for the nutrition and waste of the body; and the non-nitrogenized foods alone are incapable of supporting animal life. On the other side, Dr. Pereira advances a long argument, of which the following are the principal items. Many physiologists believe, from the results of experiments, that nitrogen is absorbed in the lungs: we have proof that non-nitrogenized compounds

really do take part in the transformations of the animal tissues, and of the possibility of their conversion into the nitrogenized constituents of an animal body, in the case of benzoic acid appearing as hippuric acid in the urine: in animals that feed on vegetable food, Dr. Prout detected no albumen in the chyme until after it had passed the pylorus, and sugar is not found in the blood, from which it may be inferred that in the duodenum, the saccharine is converted into the albuminous principle: diet even of fibrin, or of any nitrogenized principle exclusively, is incapable of supporting life. Dr. Pereira further remarks, that if nitrogenized aliment is derived from plants ready formed, the fact that fibrin, albumen, and gelatin, taken together or separately, are incapable of supporting animal life, while gluten from wheat or maize is alone sufficient to satisfy complete and prolonged nutrition, as stated by the commissioners of the French academy in 1842, remains unexplained. Neither is the necessity very obvious of more complex organs of digestion for the herbivora than for the carnivora. A hint is also given that nitrogen may be derived from the ammonia of the atmosphere, but this is unsupported by any proof except the analogy of plants, which, according to Liebig, assimilate nitrogen from that source.

We cannot undertake to settle this important question; but the remark here suggests itself, that so long as it remains undetermined, one class of physiologists believing in the formation of fibrin, for instance, from the nitrogen of the atmosphere, another class denying that nitrogen gas is ever assimilated, and affirming that nitrogenized compounds are received into the system only in a state of ready formation, it will be impossible to settle certain points in reference to food and diet. If Liebig's opinion is not established conclusively to every mind, neither is it invalidated by Dr. Pereira's reasoning. This can only be done by experiments on a wider scale. On some points there has certainly been a misapprehension of Liebig's meaning. Thus, by the expression "no nitrogen is absorbed from the atmosphere," taken with the context, this chemist manifestly means that no nitrogen from the atmosphere is employed in forming the azotized compounds of the blood, nor in what Dr. Prout terms secondary assimilation. It may also be here remarked, that protein, the basis of these compounds, is newly discovered, and its qualities by no means completely ascertained. This base, or complex radicle, has to be searched for in the chymous mass, and it is highly desirable that some of our practical chemists should inform us in what state it exists in the "incipient albumen," met with in the alimentary canal, as described by Dr. Prout.

Although there are other channels by which the elements of the human body may be received into the system, as during the absorption of water by the skin, there is perhaps, after all, little room to doubt that, under ordinary circumstances, they are mainly if not altogether derived from the ingesta. Dr. Pereira has done a good service in making the chemical elements of food a distinct consideration in dietetics, and in future all treatises on this branch of science must be considered imperfect in which it is omitted. Already is it manifest that health depends upon a due and proportionate supply of these elements, considered apart from the organic combinations into which they are formed, and that an excess or deficiency can no longer be separated from our notions of the causation of disease. Facts before us sanction the opinion, that regarding them in their ele-

mentary point of view, the quantities and proportions in which they are supplied to individuals, races, and generations, are, with other external agencies, intimately concerned in the production of temperaments and varieties of constitution. Truly our knowledge under this head is meagre, but we are in possession of a few strong facts. The satisfactory results of experiments made to determine the quantity of iron in the blood, and the effects which follow an addition or subtraction of this element, are in point. Nor can it be doubted, were our investigations pushed far enough, that equally conclusive evidence would be obtained as respects calcium, potassium, sulphur, &c. At the same time it is equally true that these elements require to be supplied to the animal system in certain forms of combination. We cannot depend upon phosphorus, or sulphur, or any other substance being assimilated to organic principles by the vital force when exhibited in the simple state; although it is highly probable that this may occur. When employed, even as medicines, the form of combination is of the utmost importance, as illustrated in the very obvious effects of certain preparations of the metal just mentioned. This element is assimilated by the blood much more rapidly when the citrate than when the sulphate is employed, a fact which may be explained by the powerful affinities exerted by the acid of the latter. When the citrate becomes absorbed the organic acid is destroyed by combustion, and the iron is readily yielded up, to enter into the structure of the blood-corpuscle. Thus, as between citrate and sulphate of iron, so, in the matter of diet, the supply of any particular element rarely admits of being regarded as a simple proposition. As in the case of nitrogen, extremely useful scales of the relative value of foods, measured by their elementary constitution, may be constructed upon the principle of Boussingault's scale of equivalents, before alluded to, yet these scales can only be regarded as approximations to the real or comparative nutritive qualities of the various articles of food.

II. Alimentary Principles. Proceeding to examine the second chapter of the work before us, we find, in the food of animals, that the elements to be employed in the economy are combined together in certain groups of two, three, or more, constituting distinct substances, the properties of which have been separately studied. To distinguish the nutritive from the innutritive parts of our aliment is no new doctrine. Hippocrates was aware that particular parts of food only are destined to take the nature and form of the human body. Many of the older authors regarded the nutritive principle as being always uniform, foods differing from each other in the proportions they contain. Others held that alimentary matters of whatever nature, must be converted into this uniform nutritive principle. Boerhaave, regarding all animal food as originally derived from vegetables, recognized aqueous, saponaceous, oily, and spirituous principles, as separable from the grosser materials; and Cullen reduced the alimentary matter of vegetables to three substances, acid, sugar, and oil. Dr. Fordyce classed vegetable foods accordingly as they contained sugar, farinaceous matter, oil, gum, and several indefinite substances called mucilage; the nutritive principles of animal foods being referred to coagulable mucilage, lymph, and oil; believing that all the animal solids are composed of mucilage and water. It is, however, to Dr. Prout that we are indebted for the first rational account of the alimentary

principles, who referred them to four great classes, the aqueous, the saccharine, the albuminous, and the oleaginous. Dr. Pereira, for reasons in some instances adduced, to which we shall refer, has extended these to twelve classes. As with the elements, we propose to describe them seriatim, reserving our principal commentary till afterwards.

1. *Water* constitutes three fourths of the weight of the human body. It is less immediately essential to our existence than air, and more so than solid food, being probably the only natural drink after the period of infancy. Many of the purposes fulfilled by water are well known. It is furnished to the system both by aqueous drinks and by many of the solid substances employed as food. The latter contain very variable proportions: thus, wheat-flour, 14·5, fresh meat about 75, cow's milk about 87, and beef-tea 98·4 per cent. These are instances taken promiscuously from a very useful table, at p. 80, of the proportions of water in different articles of diet. Whether water ever yields up its elements to assist in the formation of the organic tissues of animals is uncertain, but, according to Liebig, the hydrogen of vegetable tissues is derived from it. Dr. Prout also appears to admit that such a power is occasionally exerted by animals, and either water or its elements are intimately concerned, as shown both by Prout and Liebig, in the metamorphoses which other alimentary principles undergo in the living system. Its importance as a solvent, both in primary and secondary assimilation, and in the removal of the effete materials of the body, is equally well established. Many of the processes essential to animal life depend upon the chemical action of water, as the formation of the hydrochloric acid of the gastric juice, and of the soda of bile, from the chloride of sodium of the blood. It may be added that the quantity of water employed by the system amounts to several pounds daily, varying according to external temperature, exercise and rest, the quantity and quality of the materials received into the digestive organs or into the blood, and other causes; and while water is essential to the process of digestion, it is also rapidly absorbed by the blood-vessels of the alimentary canal, and conveyed through the portal system, holding many substances in solution, respecting which our information is at present very defective.

2. *The mucilaginous principle.* Numerous vegetable substances employed as food contain gum, in proportions varying from 1, as in rice, to 19·37 per cent., as in the kidney-bean, or even more; its constituents are carbon and the elements of water, and it is regarded by Liebig as an element of respiration. Experience shows that in its isolated state this substance is by no means easily digested in the human stomach.

3. *The saccharine principle.* This is also composed of carbon and of the elements of water in somewhat variable proportions. Respecting the use of this principle in the economy, the greatest difference of opinion prevails. Dr. Prout regards it as a nutritious substance, and the type of one class of his alimentary principles, and indeed of vegetable aliments generally; holding, that during digestion and secondary assimilation it is convertible into the oleaginous and albuminous principles, and into blood. Liebig admits that it may be formed into fat, but denies that it is ever converted into azotized compounds, or employed in the nutrition of the azotized tissues; he classes it with gum as an element of respiration, its carbon being employed as fuel for the production of animal heat.

4. *The amylaceous principle.* This is one of the most abundant constituents of vegetable food, occurring in quantities which vary from 3 to 72 per cent. Sago, tapioca, arrowroot, cassava, tous-les-mois, potato-starch, salep, rice-starch, &c., are here treated of separately as articles of diet, consisting almost entirely of starch. This principle is regarded in the same point of view as sugar, both by Prout and Liebig, except that it forms a necessary part of human food,—may be employed in much larger quantities than sugar, and its use persisted in for an unlimited period. According to Liebig, when in excess, under favorable circumstances, it contributes to the formation of fat, but is incapable of transformation into the azotized materials of blood. Both sugar and starch are easily digested in the human stomach.

5. *The ligneous principle.* This is introduced rather in deference to an opinion of Dr. Prout than from a conviction in Dr. Pereira's mind, that it is capable of yielding nutriment to man. It is true that it forms the appropriate food of various insects, and of some of the lower animals, and when reduced by various processes, it is said to form a substance analogous to the amylaceous principle. But many of the facts relating to the use of bark and wood as food, by the Laplanders and other tribes, may be accounted for by the formation and the diffusion of starch through every part of the plant, in the autumnal sap. So that starch may in reality be the nutritive principle of bread made of bark and wood. The ligneous matter of our ordinary vegetable foods is evacuated with the fæces, as indigestible refuse, being sometimes of use as a mechanical stimulus to the bowels, as the bran of wheat; and sometimes injurious, as the husks of fruit.

6. *The pectinaceous principle.* Vegetable jelly. This includes pectine and pectic acid, one or both being contained in most pulpy fruits, as currants, apples, oranges, and in many vegetables, as artichokes, carrots, and turnips. Unripe fruits contain but a very small quantity. The dietetical properties of vegetable jelly are very little known, but it is readily digested, and is probably slightly nutritive. Its components are carbon and the elements of water, plus oxygen, and like other principles of this nature, it is classed by Liebig as an element of respiration. Dr. Pereira remarks, that in consequence of the excess of oxygen in relation to hydrogen, the use of vegetable jelly may be to diminish the function of respiration. It is uncertain whether the tendency which fruits have to promote alvine evacuations depends upon this principle.

7. *The acidulous principle.* Dr. Pereira's reasons for admitting this, are, that vegetable acids constitute one of the most constant ingredients of our foods; that fruits and succulent herbs have been in use both in ancient and modern times, and vinegar from a very early period; and that the employment of vegetable acid appears, from various statements before us of the effects which result from complete and prolonged abstinence from vegetables and fruits, or their preserved juices, to be necessary for the preservation of health. The pure acids will not in every way supply the place of the natural juices, and all vegetable juices are not equally beneficial. Some of the acids, as the oxalic, tartaric, and gallic, form combinations with bases before they enter the circulation, and these compounds appear in the form of salts in the urine. Others, as the tartaric, malic, and acetic, suffer decomposition in their transit; their carbon

being converted into carbonic acid, and their salts appearing as carbonates in the urine. It will be observed that the principles already described comprise the saccharine group of Dr. Prout.

8. *The alcoholic principle.* This belongs to the oleaginous group of Prout. According to Liebig it is another element of respiration. Dr. Pereira, adopting the latter view, regards it, under some circumstances, as an alimentary principle. Its carbon and hydrogen act as fuel in the animal economy, and in cases of extreme suffering and exhaustion its "cautious and moderate dietetical use" has, on many occasions, proved invaluable. The use made of alcohol by coachmen to avoid "catching cold," and Captain Bligh's account of the good effects of a little rum served out in teaspoonfuls, in lessening the sufferings of himself and companions, arising out of the mutiny of the crew of the Bounty, are cited as examples.

9. *The oily principle.* Vegetable and animal foods contain fixed oils and fats composed of the well-known fatty and saponifiable principles. According to Liebig, these oily principles, composed chiefly of carbon and hydrogen, are incapable of forming the essential parts of blood; and, like other non-nitrogenized principles, they serve as fuel for the support of respiration. Dr. Prout holds, on the other hand, that, like sugar, they are convertible into most, if not all, of the matters necessary for the existence of animal bodies. But oily diet alone is incapable of supporting life; animals fed upon it exclusively soon die of inanition. The oily globules from the food appear to be conveyed into the blood, and to be deposited in the adipose tissue, or they contribute to the formation of the nervous tissues. The principal aliments of this class are fat, suet, marrow, butter, and olive and other vegetable oils.

Volatile oils form the material of flavour and odour of numerous productions of the vegetable kingdom employed at table either as aliment or as condiments; as of thyme, parsley, onions, &c. The oils are for the most part absorbed, and subsequently eliminated, without losing their characteristic qualities; or they may in part be burnt, and produce heat. "They stimulate but do not seem to nourish;" their principal effect being that of gratifying the palate.

10. *The proteinaceous principle.* This group differs from the albuminous alimentary class of Dr. Prout, in the omission of gelatinous substances. The dietetic properties of pure protein have not been ascertained, but its compounds form the plastic elements of nutrition of the German school. Protein is formed only in vegetables, the animal organism possessing the power of converting its various modifications into each other. Hence the importance of vegetables to animals as the exclusive source of the most essential material of their nutriment. The fibrin and albumen of blood, the substance of every variety of muscle, and of all the important viscera, the casein of milk, and accordingly the nutriment of the young, are equally dependent upon a supply of this principle. The organic material of the brain and nerves, being distinct in composition from that of all other animal tissues, is formed in the animal body only, and its formation takes place "from compounds of protein, either by the loss of some azotized compound, or by the addition of carbonized products, as fat." The proteinaceous food employed by man is derived both from animals and vegetables. In his infancy

from the caseum of milk, and in after life from the muscles, viscera, and fluids of animals; and from the seeds and other parts of plants. *Animal fibrin* is contained in variable quantities in the more usual articles of animal diet; for instance, in the muscle of beef, together with albumen, there is 20 per cent., in the sole 15 per cent., and in sweetbread 20 per cent. Fibrin speedily dissolves in the living stomach, and even in dyspeptics is regarded as of easy digestion: but, employed exclusively, it is incapable of supporting life. *Animal albumen* constitutes perhaps the most important part of animal foods. The white of eggs contains 15 per cent. Like the former substance, it is of easy digestion and highly nutritious. The gastric juice dissolves it, coagulating it in the first place, if liquid. Liebig regards it as the true starting-point of the animal tissues; with the aid of air, of the oily matter of the yelk, and of iron, the whole being derived from it during the incubation of the chick. Yet animals cannot subsist on albumen alone, but refuse it and die of starvation when it constitutes their sole diet. *Animal casein* is distinguished from albumen and fibrin by its great solubility. As it occurs in milk it is of easy digestion. Liebig asserts that no foreign substance is required to convert it into blood, and that it contains a much larger portion of the earth of bones in a very soluble form, than blood does; indicating how completely dependent the development of the vital organs in animals is upon the supply of a substance identical in organic composition with the chief constituents of blood. Milk contains from 1·52 to 4·50 per cent. As it occurs in cheese, this principle is of much more difficult digestion, requiring for its solution in the stomach as much as three and a half hours. The vegetable proteinaceous substances are also *fibrin, albumen*, and *casein;* the analyses of which do not differ from each other, or from those of the corresponding animal principles, more than two analyses differ of one and the same substance. Their nutritive powers are equal to those of the proteinized substances derived from animals. The quantities of these principles in vegetables are extremely variable; peas and beans, for instance, contain 14 or 15 per cent. of legumine or casein; rice, from 3 to 4 per cent. of fibrin or gluten; the dried juice of the carrot a little more than 4 per cent. of albumen; the potato ·5 per cent. of albumen, and ·055 per cent. of gluten. If proteinized principles be deficient in the food of herbivorous animals, nutrition is arrested; and carnivora in consuming the flesh and blood of herbivora consume in fact only the vegetable principles which have served for the nutrition of the latter. As Fordyce described it, before chemistry had determined the composition, even of water or air—"The lion may live on the horse, but the horse derives its nourishment from grass, and those animals which live on the flesh of such other animals as are sustained by vegetables may be considered as ultimately living on vegetable food."

18. *The gelatinous principle.* Dr. Prout regards gelatin as a modification of albumen, or, as "the least perfect kind of albuminous matter existing in animal bodies." This substance, as an article of food, is derived from isinglass, and from the skins, tendons, and bones of animals, and also from cellular membrane; differing considerably in its properties and its digestibility, as obtained from different sources. Gelatin differs from albumen in its chemical properties and composition, and for this and other reasons its nutritive uses cannot be identical with those of the

proteinized compounds. Liebig considers that gelatin is formed in the animal body from some of the compounds of protein, but, at the same time, that gelatinous food may contribute directly to the nourishment of the gelatinous tissues. Animals die of starvation if attempted to be nourished on gelatin alone. M. Donné tried its effects on himself; "at the expiration of six days he had lost two pounds' weight, and during the whole time was tormented with hunger, and suffered from extreme faintness, which was only alleviated after dining in the usual way." Still, the daily experience of the physician proves that gelatin, in conjunction with other alimentary substances, assists in nutrition.

12. *The saline principle.* Saline matters being essential constituents of the blood and of the organized tissues and secretions, they are necessarily component parts of our food, and among the most important, in a dietetical point of view, as entering most largely into the living solids and fluids, are common salt and the earthy phosphates. To these may be added the salts of potassa and the compounds of iron.

Although chloride of sodium is a constituent of many articles of food and of drink, yet these do not contain a sufficient quantity to supply the wants of the system; as a component of the blood, an excess or deficiency of this salt appears to affect the constitution of the blood-corpuscle, and from the salt of the blood the gastric juice derives the chlorine of its hydrochloric acid, and the bile obtains the sodium of its soda; the addition of salt to our food is therefore a necessary practice. The earthy phosphates are constantly present in the ashes of animal substances, and being necessary constituents of these, as well as of bones, they must be supplied to the system, and are accordingly component parts both of animal and vegetable food. Corn, potatoes, milk, eggs, and the flesh and blood of animals furnish, in fact, more than the demand, the excess being eliminated in the secretions. The salts of potassa are also derived both from animal and vegetable food, and all the nutritive plants contain compounds of iron, which element reappears in the blood and flesh of animals.

Our examination of the chapter of which the above is an abstract, induces us to suggest the question—what is an alimentary principle? It is manifestly not simply a proximate principle of organic substances, according to the meaning attached to that term by the chemists; although many of these are truly alimentary principles. Quinia is a proximate, but not an alimentary principle. Dr. Prout, who first made a specific application of the term, grouped several proximate materials together, to constitute one great alimentary principle. This is exemplified in the albuminous and the saccharine groups. Moreover, he holds that the diet of man, and of the higher classes of animals, to be complete, must contain more or less of all his "staminal principles;" this being illustrated in the case of milk, the only substance prepared by nature expressly for food, which contains water, a saccharine, an albuminous, and an oily matter; and again, in the food of the more perfect animals, composed, for the most part, of substances referrible to three if not to four of these staminal groups. So far, this may be considered a philosophical account of the essential constituents of food. But there is another point of view in which these principles may be regarded, viz., as identical in composition, and in the arrangement of their elements, with the materials that compose

the structures they are intended to produce or to nourish. Here Dr. Prout's arrangement fails, for there is no tissue in the animal system of which the saccharine principle is the prototype, and there are tissues which have no prototype in the food, as the nervous. The progress of discovery recently, has rendered this identity in the essential constituents of food, compared with those of the animal structures, much clearer; it has furnished new instances, and, in the school of Liebig, it has gone so far as to render it doubtful, whether the living tissues of the body are ever nourished otherwise than by the elements of which they are composed being introduced from without, in forms of combination more or less nearly allied to their own. If this doctrine were well established, there would be no question about the true basis of the science of dietetics. Dr. Pereira's "alimentary principles," however, answer neither the one nor the other of these descriptions. They appear to be compounds introduced into the digestive organs as aliment, and capable of being appropriated to any necessary, or even useful purpose, in the economy—a totally different affair; and although we are not disposed to quarrel with a name, the wisdom of the designation given to them, viewed as a whole, may be fairly doubted.

Dr. Pereira makes gum an alimentary principle distinct from sugar; not that both are essential to the nutrition of the body, but, as we read it, because gum may be employed as a dietetical and probably as a nutrient agent. Most complete have been the revolutions of opinion respecting this substance. For many years it was regarded as the most nutritious part of vegetable substances, and by some, as the only nourishment they afford; an opinion, supported by a fact, noticed by Fordyce, and quoted from him by many succeeding writers, that men have been nourished by "gum seneca" and water for many weeks, in caravans which had lost their way in the sandy deserts of Africa. Magendie's experiments, proving that animals fed on gum alone soon die of inanition, led to the totally opposite opinion, that it has no nutritive powers; and indeed it has been looked upon by some as serving no useful purpose in the economy. Liebig describes it, after passing the digestive organs, as fuel for combustion. Prout assigns to it the capability of being converted, within the economy, into some more essential nutritive compound, but of this we have no experimental proof. With respect to the story told by Hasselquist, the traveller above referred to, any opinion founded upon the use of a substance such as gum, in its crude state, and under the circumstances described, must be inconclusive. Gum senegal, in particular, is well known to differ from gum arabic, having a slightly bitter flavour. It has been said that an Arab can live upon six ounces of gum daily, but he takes it dissolved in milk, and recent experiments appear to show that gum arabic contains a small portion of azote.

Lignine is introduced upon the bare suspicion of its being a distinct principle capable of yielding nutriment to man. Pectine and pectic acid, again, have no very distinct nutritive properties. Even those materials of the ingesta, which appear to serve no other purpose in the economy but as fuel for combustion and the production of animal heat, taking no part in the nutrition of the vital structures, as taught by Liebig and his disciples, are still, while following Liebig's doctrine, separately regarded as alimentary principles; alcohol, for instance. On the other hand, some data are given, to render it probable, that the acidulous principle serves

unknown important purposes; the introduction of certain salts into the blood may be suggested. The facts published by Dr. Baly of the occurrence of scurvy in public institutions, where the diet is defective in vegetable acids, and the immediate cessation of that disease when vegetables containing organic acids are given, as potatoes, seem to confirm this opinion. The propriety of separating the gelatinous from the proteinaceous principle is obvious; and as to the saline substances, there is as much reason to regard the chloride of sodium, and probably phosphate of lime, as also iron in some of its combinations, in the light of distinct alimentary principles, as any other combination of the elements of matter employed as food.

The reasoning employed in this volume does not convince us that alcohol in any of its forms of mixture, ought to be regarded as an alimentary principle. This class of substances should surely be limited, at least, to combinations of the elements of matter, which are necessary or wholesome to be presented to the digestive organs, (for the purposes whether of nutrition or respiration,) in the physiological or healthy state of the animal economy; and under ordinary circumstances. Admitting the facts cited by Dr. Pereira, they prove at most, in our minds, that alcoholic compounds, when judiciously resorted to, are excellent remedial agents, and may be employed with advantage to counteract the effects of certain abnormal states into which the constitution of man is liable to be precipitated; be it by his follies or by virtue of his enterprising nature. Seeing no reason to doubt the rationale of its operation, adopted from Liebig; or that it serves to warm the system, when this is exposed to undue causes of depression of temperature; or to excite the organic functions, when they have become excessively depressed; such effects must be held to be therapeutical rather than dietetical; and although, in consequence of the very general employment of alcohol by civilized man, it is important to treat of it in a work on food and on precepts of diet, it cannot be proper to rank it as an approved constituent of ordinary wholesome alimentation.

The controversy at present raging as to the source of the fat of animals, whether introduced from without, or formed within the system, has an important bearing on the general subject of assimilation, primary and secondary. Liebig, comparing the quantity of fat deposited with the quantity of the oleaginous principle contained in the food, came to the conclusion that fat must be formed in the body by the abstraction of oxygen from starch, sugar, and other non-azotized food. Dumas, Payen, and Boussingault afterwards proved that the food employed in the experiment, contained much more oily matter than Liebig was aware of— that maize, instead of containing very little, has from four to nine per cent.; rendering it in some degree probable that all the fat of the animal was derived ready formed from the food. There are many most interesting facts in favour of Liebig's view; thus, bees being fed with honey alone, quite free from wax, one part of wax was produced for every twenty parts of honey consumed. The analogy between wax and oil, and the near identity of honey and sugar, seem to indicate that oily and waxy substances are formed in the economy from food. In a recent analysis, Dr. G. O. Rees found a large quantity of oil in the chyle of a donkey, first kept for many hours without food and then fed with beans; but beans are said to contain no oil, and the lymph of the animal at the same time furnished a much smaller proportion of oil than the chyle.

Since this controversy commenced, Peleuze appears to have discovered that on submitting sugar to a slow fermentation, under circumstances as nearly as possible analogous to animal digestion, the formation of butyric acid, that is to say, of one of the constituents of animal fats, takes place. This is one of the questions, upon the settlement of which our knowledge of the real digestive powers of the higher orders of animals in a great measure depends. Are Liebig and Dumas both right?—the fatty matter being usually derived from that which preexists in the food, and the system having the power of elaborating it from saccharine compounds when the supply from the former source is deficient.

A most striking circumstance connected with these alimentary principles—that no one of them, in its isolated state, is capable of affording nourishment to animals for any length of time, calls for remark in this place. They all excite aversion after they have been used for a very short time. Gluten is the only compound, belonging in anywise to this class of substances, which has been found to be consistent with prolonged nutrition. The glutinous part of wheat was first discovered early in the last century by Beccaria, who, with Rouelle, proved that to it wheaten flour and some other vegetable substances owe their superiority as human food. According to a table given by Dr. Pereira, the proportion of glutinous matter contained in different varieties of wheat, varies from 9·2 to 35·1 per cent. Now this "Beccaria's gluten" is a mixture of several organic principles. By boiling in alcohol it may be resolved into an insoluble portion, being vegetable fibrin, and a soluble part, consisting probably of at least two substances, *mucin* and *glutin;* and, as remarked by Magendie, this substance, containing much gluten (v. fibrin), "combined with a little albumen, gum, mucilage, fecula, and even sugar," is really a very compound substance. Hence its sufficiency for the nourishment of animals. A consideration of these facts leads to the conclusion, that protein and its compounds undergo some important changes in the digestive organs, to prepare them for secondary assimilation, and that they require to be mixed or combined with other substances in order to ensure the due progression of these changes.

The above remarks are in no way intended as a censure of Dr. Pereira's labours. They are made rather in exemplification of the imperfect state of dietetics as a science, and in anticipation of those improvements which may be hoped for in the third part of the organic chemistry, promised to the public by Professor Liebig.

III. COMPOUND ALIMENTS. The third and last chapter of the first part of the work before us treats of the different varieties of food as it is furnished by the markets for our tables. These consist of animal and vegetable substances in their prepared or unprepared state, every individual of which contains two or more, and sometimes many, of the alimentary principles already described. Food has been regarded, in this point of view more especially, in preceding treatises on the subject, and Dr. Pereira's work differs from others, in the chemical and dietetical properties of the alimentary principles as well as of the elements being made essential parts of this branch of medical study. We shall here have to notice Dr. Davidson's and also Dr. Truman's productions, although both the one and the other must be looked upon rather as intended for the general than the scientific or medical reader. They will be found, however,

to contain numerous interesting facts, and in some respects they supply what may possibly be regarded as omissions in the one at the head of our list, which we have chosen as a text.

That the particular kinds of food employed by different nations, and in various climates and regions of the earth, is the result of accident, necessity, and conventional usage, rather than a selection made upon rational principles, must be sufficiently obvious. In fact, no such thing as principles in dietetics could be known or surmised by man in his primitive state, and very few have been discovered in the various stages of his advance towards civilization. Still, as in other branches of hygiene and medicine, experience—although very frequently deceptive—has for the most part proved herself a faithful guide, and we deem it advantageous to be made acquainted with the customs of different nations as respects the sustenance of their bodies. In these times also, when food for the multitude is too certainly a pressing want, it behoves us to consider all possible sources thereof, and the dietetical value of every available natural production. "Quæ in terris gignuntur omnia ad usum hominum creantur," and as animals exercise their instinct in obtaining food, so man must bring his reason to determine the problem of providing aliment for multiplying generations.

We find it noticed by Dr. Truman that horse-flesh is not an uncommon article of diet in Denmark and Sweden, and a large quantity is consumed as food in Paris. The Tartars, Arabs, and Patagonians eat asses. Dogs were formerly much employed as food in Europe; they are also eaten by the Chinese, and by some savage nations, and even in civilized Paris;—evidence is in fact adduced that dog's flesh is sweet and wholesome meat. Elephants are considered delicacies in Cochin China; camel's flesh in Egypt; and in China, again, rats and moles are sold by weight in the markets, for food. Whales, walruses, seals, bears, beavers, otters, badgers, foxes, &c., are eaten by the inhabitants on the coasts of the polar seas; and the Caffres consume lions. So also, many birds and their eggs, which are foreign to our notions as articles of diet, are employed as such in different countries; and the same may be affirmed of crocodiles and various reptiles and serpents; of white ants, caterpillars, centipedes, snails, earthworms, and even human flesh. Among vegetables, chestnuts are used as a wholesome food in Lombardy by the lower classes. In Norway, during seasons of scarcity, the peasants eat chaff and the inner bark of pine trees, which are ground and baked to render them digestible. The woody fibre also of beech, birch, elm, lime, and poplar, will serve for diet when properly prepared. Acorns are said to be the principal vegetable food in California; and some nations find nourishment in earth. On the other hand, that the proscription of the productions of nature as food, by different nations, is frequently the result of prejudice, is exemplified in the facts collected by Dr. Truman.

"The inhabitants of several immense tracts of the globe entertain a marked distaste for milk; the Chinese, the inhabitants of Java, and of the other islands in the Indian Archipelago, have almost as great an aversion to it as we should have to blood; and similar objections extend also to cheese and butter among these people." (p. 29.)

Pork is eschewed by Mohammedans, Jews, and Copts, in whatever clime they live; and the ox by various castes of Hindoos,—by religious ordinances; and these articles of ordinary diet with us are, no doubt, from

education and long prejudice, by them disliked. Several tribes of people in Abyssinia have a perfect abhorrence of the flesh of the common fowl, and whole nations have rejected the use of fish.

Without professing to give credit to every account of cannibalism and geophagism recorded by travellers; or, in this place, to explain under what circumstances, for what length of time, and with what additions, chaff and earth can afford sustenance to mankind, it is quite clear that innumerable natural productions, not ordinarily so regarded, may be appropriately employed as food. The knowledge we have obtained of their constituent and alimentary principles teaches us in a great measure how, as a matter of course, it must be so, and reconciles numerous apparent inconsistencies. Extensive strata in various parts of the earth consist almost entirely of infusory animalcules, as shown by Ehrenberg; and, in particular, the "mountain meal" employed in Lapland, in 1832, with the bark of the birch tree and a little flour, for making bread, was discovered by Retzius to contain nineteen species. At present, our appreciation of the relative digestibility and of the nutritive value of these substances is very limited; but it is satisfactory to observe the investigation of these points in progress as a branch of science. In the mean time, not only must the remark quoted by Dr. Truman from Herschel be generally concurred in—that some of the facts before us "deserve a higher degree of celebrity than they have obtained, because they prove that absolute famine may be rendered next to impossible,"—but the question must force itself upon the reflecting mind; how is it possible, in a civilized community, that want and starvation should at any time be stalking abroad? Yet such things are.

From the time of Pliny, the natural history of the animals and vegetables from which food is derived, has been a subject of considerable interest with the medical practitioner; and the works of Tournefort and the Jussieus sufficiently established, from an early period, that the organic characters, the principles, and the virtues of plants are closely allied. The study of comparative anatomy and physiology has also its value. Dr. Pereira, on account of the extent of the subject, has purposely excluded all natural historical details. Dr. Davidson, on the contrary, professes to give them; in fact, they form a considerable part of his book. Nutriment may be distinguished from poison by an examination of the structure and analogies, and of the simple qualities of natural productions. We are willing to admit also that a knowledge of the native climate of our domestic animals, of their habits, propensities, modes of forming their nests, plumages, loves, &c., is all very proper for a medical man to be acquainted with; and Dr. Davidson's work will be found interesting in this way; but we do not quite understand that the pugnacity of lobsters, the manner in which fish is caught, or the method of storing away potatoes belongs, properly, to a 'Treatise on Diet,' by a grave physician.

Dr. Pereira arranges compound aliments under three primary divisions. 1, Solid foods, or aliments proper; 2, Liquid foods, or drinks; 3, Seasoning agents or condiments. This arrangement is not carried out very logically, for while broths and soups are classed as liquids, milk is placed amongst solids; it is, however, convenient, and the best, perhaps,

in the present state of our knowledge, that could be devised. The first division has two sections; 1, Animal foods; 2, Vegetable foods.

1. *Animal Foods*. These are treated of in the order of the zoological classes, the author confining himself to animals employed as food in this country. Belonging to mammalia are the ox, sheep, hog, deer, rabbit, and hare. Of which it may be affirmed that the blood, the milk, many other fluids, and every structure, are called into requisition as alimentary substances. Bones, for instance, of which those of the ox and sheep are chiefly used in making soup, afford gelatin. But soup prepared from bones has higher nutritive powers than gelatin in its isolated state,—a circumstance to be accounted for upon a principle before adverted to,—complexity of composition; for bones yield phosphate and carbonate of lime, magnesia, soda, potassa, and also fat. Again, muscular flesh, or ordinary "butcher's-meat," must not be regarded as fibrin only, but as composed of tendon, aponeurosis, fascia, nerve, vessel, cellular tissue, blood, sinew, and fat; and as yielding to the organs of primary digestion,—aqueous, saline, fatty, gelatinous, and proteinaceous alimentary principles. Of birds, a very large number are employed as food; the more important being the common fowl, the pheasant, partridge, pigeon, duck, and goose, of which the flesh, viscera, and eggs abound in albumen, fibrin, gelatin, and oil. The only reptile introduced is the green or edible turtle; the part eaten being rich in gelatin, and poor in fibrin. From the class of fishes, man obtains an endless variety of food, some nations, both in ancient and modern times, deriving from it their chief sustenance. The parts employed are the gelatinous integument, the flesh, and the viscera. The flesh is watery, and composed of fibrin, albumen, and gelatin, sometimes mixed with oil, as in the salmon and the eel, the latter principle being more abundant in the thinner or abdominal parts than in the thicker or dorsal portions; hence the preference given by epicures to the thinnest part of salmon. The white curdy matter, observed between the flakes of boiled fresh fish, is a film of albumen, produced by the coagulation of the serous juices intervening between the muscular layers. Of the crustacea many are edible, having a white firm flesh, which contains much gelatin, as in the lobster, crawfish, crab, and shrimp. Lastly, of the mollusca, a few species only are used in this country; the oyster, mussel, and periwinkle may be mentioned as examples. The flesh of the oyster, according to the analysis of Pasquier, contains fibrin, albumen, gelatin, osmazome, mucus, water, and salts.

The composition and qualities of the particular articles of animal diet vary exceedingly. Dr. Pereira has collected a few analyses, but it must be confessed that this part of organic chemistry has not at present been very completely followed out; we can only illustrate some of its results in their application to dietetics. It has already been shown that animal foods exhibit considerable differences in the quantity and proportions of their elements, and of those more essential organic compounds which have been called alimentary principles, and, accordingly, in their nutritive powers. Water is the largest constituent. Dr. Pereira remarks that, "as 100 parts of the flesh of the oyster contain only 12·6 parts of solid matter, while 100 parts of butcher's meat contain, on an average, about

25 parts, it is obvious that oysters must be less nutritive than butcher's meat." Of the proteinaceous principle, the milk of different animals contains from 1·52 to 4·50 per cent. Of the gelatinous principle, or matter which may be transformed into gelatin, bones contain from about 17 to 27 per cent., and fish, flesh, and fowl from 5 to 7 per cent. The oleaginous principle almost entirely constitutes animal fats; the various kinds of milk contain from ·11 to 4·20 per cent. The yelk of egg 28·75 per cent. Of the saline principles, which are very numerous in animal food, we have no accurate data, in fact their proportions are frequently too small to admit of being determined by our present methods of analysis. The elementary constitution of animal as compared with vegetable food, is much more closely allied to that of the blood and solids, for the nourishment of which it is intended. The ultimate composition of flesh is identical with that of blood, and while the alimentary principles occur in a much more concentrated state, than for the most part they do in vegetables, the different kinds of animal food exhibit among themselves less variety of constitution.

2. *Vegetable foods* are arranged after Tiedemann, partly by the method of natural history, and partly by the organs employed. There are two primary classes: I, Aliments derived from flowering plants; II, Aliments derived from flowerless plants. The first class has seven orders according to the parts used as food,—seeds, fruits, leaves, &c. The orders of the second class are botanical, viz., ferns, lichens, algæ, and fungi.

The present chapter contains such a vast mass of detail, including numerous chemical analyses, that we can only undertake to give a general view of it, with an occasional allusion to principles available in dietetics. The first class of vegetables is by far the most important. *Order* A,—comprises the seeds, among which the cereal grains contain an abundance of the vegetable nitrogenized materials, identical in composition with those of animal bodies, but diluted—so to speak—largely, with non-nitrogenized constituents. The proximate principles of these grains are starch; vegetable albumen; v. fibrin, gluten, and mucin, and oily matter, constituting raw or ordinary gluten; also, sugar; gum; earthy phosphates; ligneous matter in the form of bran, husks, &c.; and water. But of these, the different species and the varieties of each species of grain furnish very different proportions. Taking protein and its compounds as a standard, wheat is the most nutritious; oats, according to Boussingault's analysis, are nearly equivalent, then come rye and barley. Rice contains only from 3 to 4 per cent. of any proteinized principle, and above 80 per cent. of starch;—and maize, another most important source of human sustenance, appears to contain 5 or 6 per cent. of the former, to about 80 of the latter, with a considerable quantity of oil, and some gum and sugar. The various kinds of bread in general use by mankind are made of these cereal grains. Next in importance are the leguminous seeds, of which, chiefly, peas and beans are used in this country, containing from 10 to 14 or 15 per cent. of vegetable casein, a little gum and albumen, but no oil. The oily seeds, as the almond, walnut, &c., are composed of a large proportion of fixed oil; the former, according to Boullay's analysis, of 54 per cent. Thus the seeds of plants furnish an abundance of all the staminal principles of Dr. Prout;

they were among the most primitive materials employed, and still constitute the largest portion of the food of mankind. Their greatest deficiency is in the organic acids.

Ord. B. Of the fleshy fruits of the earth, a vast variety are eaten, and many are important articles of diet. None contain more than the most minute quantity of nitrogenized matter. Water forms the greater part of all, but its proportion lessens, and the quantity of solid matter increases as they become ripe; being in the drupaceous fruits from 70 to 90 per cent. Cucurbitaceous fruits are the most watery, the cucumber containing 97·14, and the melon 98·5 per cent. Gum, pectin, sugar, and the acids also enter into their constitution. When ripe, the quantity of sugar is in general greatly augmented:—in the cherry, for instance, from 1·11 to 18·12 per cent. The acids are chiefly the citric, tartaric, and malic; occurring free, or in combination with bases. Fruits contain also volatile oils, colouring matters, lignin, and particular extractives; and each fruit has in general some peculiarity in its composition, upon which its sensible and some of its dietetical qualities depend. Dates constitute a considerable portion of the food of many of the inhabitants of Egypt, Arabia, and Persia; according to a recent analysis by Reinsch, they are composed of more than half sugar, with pectin, pectinaceous gum, bassorin, fatty oil, and wax, but no nitrogenized principle; so that the chief nutritive material would appear to be sugar. The fig, which is eaten so much as food in eastern countries, also contains 62·5 per cent. of granular sugar. The olive, grape, oranges, lemons, pineapple, mulberries, strawberries, raspberries, and many others, are separately treated of;—space will not admit of any detail respecting them.

Order C consists of roots, subterraneous stems, and tubers; including the turnip, carrot, parsnip, beet, potato, and Jerusalem artichoke. The turnip contains 92·5 parts of water to 7·5 parts of solid matter, and a minute quantity of two nitrogenized substances,—v. albumen, and v. fibrin; but the most important substance in this order is, undoubtedly, the potato; its constituents being water, starchy matter, ligneous matter, v. fibrin, v. albumen, and gluten, oil, gum, asparagin, extractive, vegetable acids, salts, and occasionally, solanina. According to Einhoff, its acid is the tartaric combined with potassa and lime, but by Vauquelin it is regarded as the citric,—partly free and partly in combination with those bases: in its raw state it contains from about 66 to 75 per cent. of water.

The remaining orders include:—*Or.* D, buds and young shoots; as the onion tribe and asparagus, the former containing an acid vegetable oil, and the latter asparagin, a peculiar nitrogenized compound, regarded by Liebig as a nutritive agent:—*Or.* E, leaves and leafstalks; as the the cabbage, cauliflower, brocoli, watercress, lettuce, rhubarb, turniptops, spinage, &c., the green colour depending upon chlorophyle, a substance in the form of globules, in nature between resin and fat, and but little acted on by the digestive organs:—*Or.* F, receptacles and bracts; the artichoke, which contains a saccharine and mucilaginous juice, with starchy matter, being the only individual mentioned:—*Or.* G, stems; furnishing farinaceous substances, as sago.

The second class of vegetables comprises—a few tuberous roots or rhizomes, used only in times of scarcity;—certain lichens, which owe

their alimentary qualities to a starchy matter usually accompanied with a bitter principle,—hence they require to be prepared before they are employed for food. Some are eaten by the hunters in the arctic regions under the name of "Tripe de Roche." Also certain species of algæ, which abound in mucilaginous or vegeto-gelatinous substances, to which they owe their dietetical uses; they also contain starch, and sometimes sugar. Carrageen, or Irish moss, is an example, the carrageenin being more nearly allied to pectin than to any other vegetable principle. Of the last order—fungi—three species only are used as food in this country, while in Russia they employ thirty-three species. The supposed alimentary principle of mushrooms is fungin, a substance allied to lignin, but, according to Braconnot, highly nitrogenized, although Vauquelin obtained from it little nitrogen, and Müller considers fungin to be one of the more simple nutritive substances.

3. *Liquid aliments or drinks.* The compounded liquid aliments are arranged in six orders. *Or.* A, *Mucilaginous, farinaceous, or saccharine drinks;* called "slops" in this country, and "tisans" on the continent. They differ but little from common water, have slight nutritive powers depending upon gum, sugar, &c., held in solution, and are employed as diluents and demulcents. *Or.* B, *Aromatic or astringent drinks.* This includes tea, coffee, chicory, chocolate, and cocoa. Tea contains 12 to 18 per cent. of tannic acid, also volatile oil, gum, albumen, resin, &c., and theine, (c. 8, h. 5, n. 2, o. 2,) a salifiable base, existing in combination with a part of the tannic acid. Hot water extracts the tannate of theine and also the tannin, but in cooling both substances precipitate. Theine, with the elements of water, and an excess of oxygen, is equivalent in composition to taurine. Liebig has accordingly suggested that tea may have some direct influence over the formation of bile; and that in sedentary persons, who take little azotized food, and in whom there is little waste of matter, tea may benefit the health by furnishing materials to form bile. The flavour of tea and its influence on the nervous system depend on its volatile oil. Coffee contains theine and several peculiar principles, as caffeic acid, upon which, probably, its odour depends. Like tea, it diminishes the disposition to sleep. The infusion or decoction of chicory forms a perfectly wholesome beverage. Chocolate kernels, or cocoa seeds, differ exceedingly from the last-mentioned substances, they contain 53·10 per cent. of oil, and 16·7 per cent. of albumen, with starch, mucilage, and lignin; also theobromine, (c. 9, h. 5, n. 3, o. 2,) which, from its analogy to theine, Liebig suggests, on hypothetical grounds, may contribute to the formation of bile and urine. Cocoa is somewhat less oily than chocolate, and rather astringent; when properly made it is freed from much of its oil.

Or. C, *Acidulous drinks.* They consist of water as a basis, and, usually, of a vegetable acid; being prepared with the juice of fruits, or by dissolving acids or acidulous salts in water, or by the decoction of fruits; as lemonade, imperial, and apple tea, respectively. Both the acid and water contribute to allay thirst. In this order are arranged carbonated or effervescent drinks, as soda water, &c. *Or.* D, *Drinks containing gelatin and osmazome.* These are essentially decoctions of meat, but frequently contain vegetables. By the agency of water and heat in

making broths and soups—bones, aponeuroses, cellular tissue and tendons yield gelatin; fatty matters are melted and diffused; and various products are obtained by unknown reactions.—*a*. Creatine, a nitrogenized crystallizable substance. *b*. Osmazome, the extractive upon which the odour and flavour chiefly depend. *c*. Ammonia. *d*. A sulphuretted compound. *e*. A volatile acid, analogous to acetic acid. *f*. An odorous volatile acid, similar to butyric acid. The last three being wholly or partially volatilized. The vegetables employed communicate colouring, mucilaginous, saccharine, azotized, and sometimes sulphuretted matters, with volatile oils and salts. The amount of nutritive matter in broth does not exceed 3·5 per cent. Beef-tea, mutton, veal, and chicken broths, are the lightest forms of animal food. *Or*. E, *Emulsive or milky drinks*. These hold in suspension an oily substance in a finely divided state. Almond milk contains in solution, casein, sugar, and gum; and retains in suspension a fixed oil; agreeing in many of its properties with animal milk.

Or. F, *Alcoholic and other intoxicating drinks*. The amount of spirit contained in beer (according to Brande, as given in a table at p. 158), is from 1·28 to 8·88 per cent., and the extract yielded, or its fixed nutritive constituents, are starch, sugar, dextrine, lactic acid, salts, the extractive and aromatic parts of the hop, gluten, and fatty matters; but the quantities are subject to great variation. An imperial pint of good porter gives about an ounce and a half of extract. Dr. Pereira thus proceeds:

"Considered dietetically, beer possesses a threefold property: it quenches thirst; it stimulates, cheers, and, if taken in sufficient quantity, intoxicates; and, lastly, it nourishes or strengthens. Its power of appeasing thirst depends on the aqueous ingredient which it contains, assisted somewhat by its acidulous constituent. Its stimulating, cheering, or intoxicating power is derived either wholly or principally from the alcohol which it contains. Lastly, its nutritive or strengthening quality is derived from the sugar, dextrine, and other substances contained in the extract. Moreover, the bitter principle of hops confers on beer tonic properties.

"From these combined qualities beer proves a refreshing and salubrious drink (always presuming that it is used in moderation), and an agreeable and valuable stimulus and support to those who have to undergo much bodily fatigue. When Dr. Franklin asserted that a penny loaf and a pint of water yielded more nourishment than a pint of beer, it is obvious that he regarded beer merely as a nutriment, and overlooked its stimulating and cheering qualities, of which bread and water are totally devoid." (pp. 415-16.)

Strong ales are richer in alcohol, sugar, and gum, than any other kind of malt liquor.

The term *wine* includes the fermented juice of fruits and saccharine fluids generally, but in a dietetical point of view, liquids obtained by the vinous fermentation of the juice of the grape are most important. The bouquet, or perfume of wine, seems to be an ether (œnanthic), formed by the action of an organic acid on alcohol, during fermentation. All wines are more or less acidulous, from the presence of acetic, carbonic, tannic, tartaric, and probably malic and other acids; but they vary much in this respect. Liebig is quoted, to the effect, that those wines which have most acid have most perfume; and that the acid and characteristic perfumes have some intimate connexion, since they are always found together.

Yet, a few pages onward, we are told that Johannisberger, possessed of a very choice flavour and perfume, is characterized by an almost total want of acidity. Bitartrate of potassa is the most important saline constituent, to which is frequently added tartrate of lime, and tartrate of alumina and potassa. The quantity of alcohol contained in wines varies greatly—from 12 to 20 per cent. in the more ordinary kinds. It varies also in each wine according to its age. The other constituents of wine are chiefly water, sugar, gum, extractive and colouring matters, gluten, sulphate of potassa, and chlorides of potassium and sodium. But the nutritive principles are extremely scanty.

In justification, we may say, of the position in which it is placed, as a dietetical fluid, Dr. Pereira states,—"wine, when used in moderate quantities, as to the extent of two or three glasses daily, proves a very grateful, and to those who have been accustomed to it, an almost indispensable stimulant." It quickens the action of the heart, diffuses warmth, augments muscular force, excites the mental powers, and banishes unpleasant thoughts;—is compatible with perfect health, and many who have thus employed it daily have attained a good old age: its regular use is better adapted for those who lead a life of labour and activity than for the indolent or sedentary. At the same time the two-fold admission is made, that the most perfect health is compatible with *total abstinence*, and that its habitual employment is calculated to prove injurious. "To a person in perfect health, and who has been unaccustomed to it, no possible benefit can accrue from commencing its use." The preternatural excitement which it occasions is followed by a corresponding degree of depression, and the habit of using alcoholic stimulants creates a want for them. After giving Dr. Paris's testimony that "there exists no evidence to prove that a *temperate* use of *good* wine, when taken at *seasonable hours*, has ever proved injurious to *healthy* adults," Dr. Pereira concludes, "*All I would assert is, that, for healthy individuals, wine is an unnecessary article of diet.*" (p. 426.) Wine differs somewhat in its action upon the system from ardent spirits. While those who drink the former are fat, lusty, and plethoric, spirit-drinkers are generally thin and emaciated. The disorders most likely to be induced by wine are those of the digestive organs, of the brain, gout, gravel, and dropsy; while spirits more frequently occasion diseased liver, and delirium tremens.

4. *Condiments* are of five kinds; saline, acidulous, oily, saccharine, and aromatic or pungent. Various organic principles of food escape entirely the action of the primary digestive processes, and are carried unaltered into the mass of the blood. Thus circulated throughout the tissues, they influence the functions of the organs, and probably in some instances, the processes of assimilation. Extractives, tannin, volatile oils, the acrid principles of cruciferous and alliaceous plants, thus escape the action of the digestive organs, retaining their sensible qualities in their progress through the economy: and the impressions they make on the different organs, as also their elimination, may frequently be observed. Thus, they produce effects independent of the nutritive powers of the aliments of which they form a part; these are for the most part stimulant, exciting the action of the heart and arteries, augmenting respiration and animal heat, or irritating special tissues.

The spices, as cloves and nutmeg—labiate plants, as mint and thyme—the fruits and other parts of umbelliferous plants, as parsley or caraway—and some alliaceous plants, owe their powers, as condiments, to volatile oil; but Dr. Pereira is decidedly in error where he refers the properties of ginger to this principle. The acrid principle of ginger is soluble in alcohol, and may be obtained as an extract by evaporating the menstruum. Cinnamon is slightly astringent, and to pimento and cloves have been attributed the property of retarding the fermentation of organic substances, both within and without the stomach. Mustard, cayenne pepper, and common black pepper are among the most powerful local stimulants. The introduction of sugar, oil, salt, and vegetable acid into this part of the work, as condiments, having described them as alimentary principles, and the omission of a substance like cheese, is calculated to create considerable confusion in the mind.

In favour of the use of condiments, it has been urged, that nations almost uniformly employ them, and there is a general dislike by mankind to insipid food, and a desire for sapid qualities; that they serve important purposes in the economy, preventing or arresting ordinary fermentative processes, exciting the secretions necessary to animal digestion—as the saliva, and also the peristaltic action of the intestines; and that their use is founded on an instinct of nature. It must be confessed that the experiments of Beaumont, and the doctrines contained in the work before us, by explaining their modus operandi, and in particular their excitant effects, sanction the views of Cheyne, Cadogan, and others, who regard them as unnecessary, and condemn their indiscriminate use. When confounded together in the form of *sauces*, mostly contrived to please the palate and excite appetite, as "stimulating provocatives," they affect the stomach as alcohol does, and in the healthy state they are non-essential to digestion and afford no nutriment. If it be admitted that in moderation and judiciously selected, they are harmless and even useful, particularly as they occur in food naturally; at the same time it is not to be doubted, that in an isolated state and employed in excess, according to the too frequent customs of the table, they are not only unnecessary but pernicious. These remarks apply to condiments which are not alimentary principles.

The adulterations of food are professedly treated of in Dr. Davidson's work, as indicated in the title-page. These come under three descriptions. 1. Where the nutritive powers are diluted, as in the adulteration of wheat flour with potato-starch, or milk with water. 2. Where one material is substituted for another on account of a difference in price, as the mixture of honey with sugar. 3. Where something positively injurious is combined with food, as lead in the colouring matter of cheese, alum in any notable quantity in bread, or cocculus indicus in beer. Various methods of detecting such adulterations have been employed. By means of the microscope the adulterations of arrowroot with potato-starch may be detected, the latter presenting the appearance as if closely studded with minute globules of mercury. Roasted corn mixed with coffee may be detected by iodine: sloe leaves in tea by their botanical characters. On this part of the subject, Dr. Davidson's work is very incomplete, as looking to its title-page and bulk—how should it be otherwise? With respect to the use of alum in bread, Dr. Pereira remarks:

"Whatever doubts may be entertained as to the ill effects of alum in the healthy stomach, none can exist as to its injurious effects in dyspepsia. Bread which contains alum is objectionable, not merely on account of this salt, but because it is generally made from inferior flour, which, when mixed with yeast and water, and formed into dough, quickly passes through the stage of vinous fermentation, and becomes acid." (p. 311.)

As belonging to this subject also, the soil in which culinary plants are reared, the effects of cultivation, the food with which animals employed at table are fed, and the health both of plants and animals are of the first importance in an hygienic point of view. Dr. Pereira furnishes several illustrations. The ergot of rye, the diseases of wheat from fungi and parasites, and impure milk, may be cited as examples. The qualities of cow's milk are greatly modified by the food of the animal. It is probable that the species of phthisis to which cows are liable, in which it has been ascertained that the milk contains seven times more phosphate of lime than usual, would be attended with injurious results:

"This subject is one of the greatest moment, not only in reference to the frequency of disease in cows, and therefore to the possible morbific character of their milk, but also in reference to the milk of the human subject. I think with these facts before us, it would be highly improper to allow a female with any trace or suspicion of tuberculous disease to suckle. Not that a few grains, more or less, of phosphate of lime in the milk can probably do any injury to the child; but the fact once established, that the milk may be thus altered by disease, leads to the suspicion that some other substances, not yet recognized by their physical or chemical characters, may be in the milk of diseased nurses, and which may have an injurious influence on the child; and the suspicion does not confine itself to those affected with tuberculous diseases; other hereditary or constitutional affections may be attended with altered conditions of the milk. This suspicion is strengthened by the common observation that the milk of different nurses does not equally suit the same child; nor that of the same nurse different children." (Pereira, pp. 255-6.)

Dr. Prout suggests that the diseased liver of the goose obtained by an artificial diet,—the *foies gras*—may produce the fatty degeneration of the liver, in those who employ it; and the organic chemistry of Liebig gives great countenance to such a notion. If fibrin has a vital attraction for fibrin, and albumen for albumen, in a healthy state, we see no reason why the morbid element may not first inoculate the livers of those who consume it, and then convert them into similar masses of disease. Add to these examples, the familiar facts of skin diseases and bowel attacks being produced by crustaceous and molluscous food; that the fat of geese badly fed has sometimes produced symptoms of poisoning; that the same result has followed the use of sausages made of the flesh and viscera of animals, which have acquired deleterious properties by keeping; that the oily matter about the fins of smoked salmon have produced diarrhœa; and that putrid pickled salmon has occasioned death in this country; that Dr. Prout has seen well-marked instances of an oxalate of lime nephritic attack, following the free use of rhubarb, which contains oxalic acid, particularly where hard water was at the same time in use;—facts interspersed in Dr. Pereira's volume—and the importance to the medical practitioner of every circumstance that relates to food becomes abundantly manifest.

The ancients had an exalted idea of the advantages of pure water to the human constitution. They were not only careful in the selection of water, but went to a great expense in preparing it by boiling, both for

drink and for making wines; afterwards cooling it with snow or ice; and public buildings were erected for these purposes. The moderns, it must be confessed, have exhibited a great degree of carelessness on this point. In a foot-note Dr. Pereira states the following fact:

"At the Nottingham Assizes in July, 1836, it was proved at a trial, on which I was a witness, that dysentery, in an aggravated form, was caused in cattle by the use of water contaminated with putrescent vegetable matter, produced by the refuse of a starch manufactory. The fish (perch, gudgeon, pike, roach, and dace,) and frogs in the pond, through which the brook ran, were destroyed. All the animals (cows, calves, and horses,) which drank of this water became seriously ill, and in eight years the plaintiff lost twenty-four cows and nine calves, all of a disease (dysentery) accompanied by nearly the same symptoms. It was also shown that the animals sometimes refused to drink the water; that the mortality was in proportion to the quantity of starch made at different times; and that, subsequently, when the putrescent matter was not allowed to pass into the brook, . . . the fish and frogs began to return, and the mortality ceased among the cattle. The symptoms of illness in cows were as follows: the animals at first got thin, had a rough, staring coat, and gave less milk (from two to three quarts less every day); they then became purged, passed blood with the fæces, and at length died emaciated and exhausted. On a post-mortem examination, the intestinal canal, throughout its whole length, was found inflamed and ulcerated. The water, which I examined, was loaded with putrescent matter, and contained chloride of calcium, (derived from the chloride of lime employed in bleaching the starch.) Traces of free sulphuric acid were occasionally found by one witness." (p. 89.)

Decomposing organic matter in water has long been known to produce dysentery in warm climates; and in this country, in warm weather, the water from our tanks and reservoirs is a prolific source of slighter bowel affections. On the other hand, it cannot be disputed that water, not of the purest kind, is constantly employed by whole families and districts, without our being able to trace to it any injurious effects. Are we then to infer that it does no injury to the constitution? We think certainly not. How many diseases of secretion and nutrition are there, the causes of which have not yet developed themselves? How numerous in all classes of society are the instances of individuals who, without having any determinable disease, acute or chronic, are in a state of health below the hygienic standard? Sir J. Sinclair relates of the inhabitants of Dengy Hundred, Essex, that a very marked improvement took place in their health, in consequence of good water being obtained by sinking a well 500 feet deep. The report of the Poor Law Commissioners for 1842 contains many facts relating to this subject, some of which are quoted by Dr. Pereira at page 95. Fatal dysentery, now rarely met with, formerly prevailed in the navy from the use of impure and putrid water. Mr. Bell, surgeon in Cork, obtained for the troops occupying the barracks, an immunity from the same disease, by substituting spring water for that of the river Lee. It is not only animal matter but mineral substances also that are to be feared—lead for instance, in the waters from our cisterns. Pinel and Schwilgue traced chronic diarrhea and other affections to the well water of St. Salpêtrière, which contained a great quantity of sulphate of lime and other purgative salts, and Parent du Chatelet attributes similar illnesses in St. Lazarus to a similar cause. Dr. Pereira observes—it is by no means improbable that diseases may be induced in the human subject, as in the lower animals, by vegetable and animal parasites derived from water.

"This suspicion is strengthened by the case related by Dr. A. Farre, of a woman who passed by the bowels substances having the ordinary appearance of shreds of false membranes, but consisting entirely of confervoid filaments, probably belonging to the genus oscillatoria. The patient drank the ordinary water which supplies London, and it is not improbable, therefore, she may have in this way imbibed the reproductive sporules." (p. 93.)

If very bad water will produce severe disease and death, the long continued use of that which is less impure may be attended by equally injurious consequences. There can be no reason to doubt, that this is one amongst many causes of physical imperfection in large communities, too much disregarded both by the profession and the public. Excepting alcohol, which might probably be omitted altogether, water is the basis of all our fluid ingesta, and fluid, is of equal importance to health, and as prolific in disease, as solid food. Whether the injurious effects of bad water are counteracted in any degree by the use of alcohol is by no means obvious—even if it be so, we have as it were the resultant of two injurious but opposed forces.

The contents of the entire first part of this volume leave it no longer a question whether man is by nature an herbivorous or an omnivorous animal: he is unquestionably the latter, and capable of being nourished by an animal or a vegetable diet exclusively, because the essential alimentary principles of both are the same, and his digestive organs are suited for the primary assimilation of either. Man is an omnivorous animal, also, because a mixture of animal and vegetable substances appears hitherto to have proved most conducive to the highest grade of physical and intellectual vigour of which he is by nature susceptible. But although this question, so much discussed, may appear to be definitively settled, there is another which has scarcely been considered, except partially, viz., the influence on the constitution, of a more or less highly concentrated state of the various alimentary principles, in our habits of diet. An examination of the facts disclosed of late years by physiology and chemistry will enable us to form some correct opinion upon this subject. As pointed out by Dr. Prout, the best, nay the only type of a perfect diet is milk, the nutritive qualities of which are well described by Dr. Pereira:

"Out of the casein of milk are formed the albumen and the fibrin of the blood, and the proteinaceous and gelatinous tissues. The butter serves for the formation of fat, and contributes with the sugar to support the animal heat by yielding carbon and hydrogen to be burnt in the lungs. The earthy salts are necessary for the development of the osseous system, the iron is required for the blood-corpuscle and the hair, while the alkaline chloride furnishes the hydrochloric acid of the gastric juice." (p. 256.)

Although milk is the only substance prepared by nature for no other purpose but for food, still, many other compound aliments contain several of the alimentary principles, so combined and presented to us by the same bountiful hand, as to leave no doubt of their being intended for the nourishment of our bodies; wheat, and it may be added, the flesh of animals for instance. Although the supply of the latter be small, it is equal in carnivorous animals to prolonged nutrition; as shown by the following fact from Magendie. "Dogs fed solely for 120 days upon a limited quantity of raw meat, preserved their health and weight during the whole period, but when fed with more than three times the quantity

is below the standard of the English labourer, as measured by the quantity of proteinized principles, may be added, that the strength of the Irish is very apt to fail them at a comparatively early age; that the vital force of an indifferently fed Irish labourer is below that of a well fed English labourer; and that experience has shown the former to be particularly obnoxious to diseases of debility. Rice again is said to be "the grand material of food on which a hundred millions of the inhabitants of the earth subsist;" but we well know that these people live not on rice alone; milk forms a common constituent of their food; and independently of this, in proportion as they depend on rice for nourishment, do they consume the greater quantity. In Alexandria, the food of the peasantry, as the Fallaheen women, is chiefly a few lentils, rice, dates, bread made of beans or oatmeal paste, perhaps a little sour Arab cheese, with salt, sometimes black olives, a small quantity of honey, or some gourd or water-melon. These contain all the essential principles of nourishment; but the people get little of them, consequently they are a sickly and emaciated race, and death from absolute starvation is no uncommon thing. Every problem of this kind to be solved must be worked upon chemical data, and our knowledge must turn upon dietetical statistics on a large scale; without which there can be no hope of discovering comprehensive principles. A question again suggests itself here, which does not appear at present to have been much entertained by physiologists: — What quantity of each of the elements or of the staminal principles is necessary for continued health in the various states and circumstances of human existence? This question has been most inquired into in reference to the element carbon; but our information is not yet very precise. Dr. Pereira leans to the opinion (p. 10) that about one pound is required daily, by a hearty adult; subject to considerable variations, according to age, sex, peculiarities of constitution, temperature and density of air, occupation, clothing, &c. Both carbon and hydrogen being regarded as fuel for the production of heat, besides the causes of variation mentioned, the quantity demanded of the former, must depend partly upon the quantity of the latter, available in the economy. This has the greater influence, in so far as that a given quantity of hydrogen, as compared with the same quantity of carbon, combines with double the amount of oxygen, and the heat developed is proportionate to the oxygen employed in these processes of combustion. Again; of the nutritive principles: if it be a fact that some materials in the food, although incapable of affording nourishment of themselves, yet contribute essentially to nutrition when taken in conjunction with others, the question as to quantity can be answered, in the present state of science, only approximately.

II. OF DIET.

This brings us to the consideration of "the adaptation of aliment to the different wants and conditions of human existence," constituting the second part of Dr. Pereira's volume; comprised in five chapters: I. Of the Digestibility of Food. II. Of the Nutritive qualities of Food. III. Of the times of Eating. IV. Dietaries. V. Of Dietetical regimen suited to disordered states of the Digestive Organs. We shall deviate in some measure in our notice of these subjects from the author's order of arrangement.

I. OF THE DIGESTIBILITY OF FOOD. The notion insisted upon so much by Fordyce, and in fact entertained by his predecessors, that all food must be digested before it can afford any nourishment, has by no means been set aside by any recent discoveries in organic chemistry. All food must undergo certain special changes in the prima viæ before it can constitute chyle, and in all animals it remains there, for a certain length of time, for the purpose. This proposition is true of milk, of the albumen of egg, of the staminal principles of Prout, of the alimentary principles of Pereira —even of oil, which appears to undergo a slighter modification than any other substance, previous to its entrance into the lacteal vessels. The comparative digestibility of the innumerable varieties of food, and of their constituent parts, is of the highest practical importance. As remarked by Cullen, " the powers of the stomach being given, there is a difference in the digestibility of different substances, arising entirely from their differences of (composition and) texture." All writers have made this difference a principal subject of investigation, but their decisions have been too frequently founded upon imaginary qualities and false analogies, and the sciences either of chemistry or physiology do not even now supply many certain or very extensively applicable data. Dr. Pereira considers in this chapter, which is very short, the digestibility of food as " affected by circumstances relating to the foods themselves," and as " affected by circumstances relating to the individual or organism." In so far as these are separable, we shall confine ourselves, under the present head, to an illustration of the former, which we hold to be the more correct application of the term " digestibility."

1. *The cohesive force* is obviously opposed to digestibility, and tenderness of fibre promotes it; hence nature has provided the means of securing minuteness of division by appropriate masticatory organs, and many influences to which food is subject also promotes digestibility by lessening this force. The incipient decomposition of animal food, and violent muscular exertion used by animals immediately before death, act in this way. The admixture of a due proportion of water with substances intended for digestion is most necessary; and nature in this instance again has secured the direct fulfilment of her own objects by providing organs for the secretion of saliva; for, whatever further purposes saliva may serve, this is unquestionably one; and the comparative facility of digestion of various substances frequently turns upon the degree of readiness with which they become incorporated with it. Dr. Beaumont found that tendon, owing probably to its compactness of texture, required five hours and a half for complete digestion in the stomach, whereas, jelly required only one hour.

2. *Chemical constituents.* Some of the alimentary principles are naturally slower and more difficult of digestion than others. The gelatinous principle in many of its forms is by no means easily acted upon in the stomach. It has to be remembered that from ten to fifteen grains of dry gelatin renders four ounces of fluid a tremulous jelly; that substances taken into the stomach require a certain degree of pulpiness to enable them to be acted upon by the stomach, for which purpose their more fluid parts are absorbed, and that semi-fluid substances, as jelly, are for the most part swallowed without insalivation. Hence soups containing much gelatin, the juices of fruits composed of the pectinaceous principle,

and even mucilaginous fluids, are apt to remain in the stomach for some time before the absorption of their fluid parts takes place. The oleaginous, as compared with most other alimentary principles, has been understood by all writers to be slow and difficult of digestion. This is shown by the natural antipathy which the tender stomach of the young has to uncombined fat, by oily matter frequently becoming uneasy in the stomach, and by its effect on valetudinarians. "Two members of my family," says Mr. Thackrah, "were annoyed with disorder of the stomach after breakfast. One in particular was uneasy, depressed, and irritable, during most of the forenoon. Plain bread or toast was substituted for buttered toast, and the disorder was removed in the one case and materially relieved in the other." Dr. Pereira insists much upon this point. Oleaginous matters, he states, are first converted into liquid oil in the stomach, then they form a kind of emulsion containing myriads of oily globules, in which form they are absorbed by the lacteals. This process, and perhaps some other unknown change, is affected by the bile, which is found in the stomach during the chymification of fatty substances.

"The popular notion that oily or fatty foods 'cause bile' in the stomach, is not, therefore, so groundless as medical men have generally supposed. From Dr. Beaumont's observations and experiments, it appears that oil is slowly, and with great difficulty, acted on by the gastric juice; but that the admixture of bile greatly accelerates chymification. Perhaps the alkaline property of the bile partly contributes to this effect." (p. 171.)

Fat is also liable to float on the surface of the stomach as an oily pellicle, becoming odorous, sometimes highly rancid, and exciting heartburn, nausea, and eructation, or at times actual vomiting;* and the greater tendency of some varieties than others to produce these effects, depends upon a greater facility in evolving volatile, acrid, and irritating acid and non-acid principles. Mutton fat contains hircic acid, and butter no less than three volatile acids—butyric, capric, and caproïc acids; and it is by the changes of composition effected by heat, that oily and fatty substances, after cookery, are more apt to disturb the digestion than fresh and sweet new oil as employed in salads. The observation made by Dr. Combe and others, that the fat of salt pork and bacon is less apt to prove injurious than fresh animal fats, is referred by the author to some change effected in the process of curing. Upon these principles, Dr. Pereira explains the liability of numerous aliments, containing a large proportion of oil, to disturb the stomach. The yelk of eggs, the liver and brain of animals, milk, rich cheese, fried dishes, puddings, cakes, chocolate, the oily seeds, as the almond and walnut, hashes, stews, and many foods in which the oily principle is liable to be taken "in a concealed form," for instance: the indigestibility of the salmon, eel, sprat, and herring, as compared with the whiting and haddock, is owing also to a greater proportion of oil in their composition.

Of the compound aliments, vegetables are held to be slower of digestion than animal foods, and crude vegetables to be more difficult to digest than meat or farinaceous substances; but a discrepancy of opinion exists on the subject. Dr. Cullen gave as a reason, that he had known portions of apple eructated without alteration two days after they had been swallowed, which undoubtedly happens; but Dr. Beaumont found that apples are easily digested in the stomach, requiring only about an

hour and a half for the purpose. Imperfect mastication and insalivation accounts for the fact cited, and the structure of the teeth in man and herbivorous animals compared, indicates that vegetable foods require these processes more particularly. It may be here stated, that experiments made on animals by Schultz, led him to the conclusion, that crude vegetables and other indigestible matters are apt to excite a rapid motion of the stomach, by which they are propelled through the pylorus unaltered, in consequence of which they disturb the after stages of the digestive process. The evidence adduced of late, favours the conclusion, that vegetables are for the most part easily digested in the healthy human stomach, and that the argument founded upon experience is in this, as in many other instances, fallacious; the disturbances excited by their use depending rather upon other causes than any inherent quality which prevents or retards their digestion. To this remark, however, there are some exceptions.

3. *Proneness to acidity* is regarded by Dr. Pereira, with all the writers on diet, as a quality which contributes to render various kinds of food indigestible. Hippocrates and Galen, observing that the use of acescent vegetable matters augments the natural acidity of the animal humours, referred many evils to a superabundance of acid; and Sylvius and the chemists attributed half our diseases to an acid acrimony in the system. Very vague notions are even now entertained on this subject. We have, in the first place, to distinguish between the effects of acids taken into the stomach ready formed, as part of the food; and secondly, the effects of acids developed in the stomach from the food. Reasons are given, in the first part of the work, to show that an acidulous alimentary principle is not only digestible and wholesome, but also necessary. Combining with bases in the alimentary canal, the vegetable acids convey saline compounds into the blood, which have their ulterior uses. To acetic acid, in particular, the indigestible qualities of various fruits and other substances have been attributed, yet this acid is a component part of the gastric juice, and one of the best solvents of proteinized substances. Used in moderate quantities in the healthy stomach it promotes digestion. Many substances containing ready formed acids are liable, from other causes, to disturb the digestive organs and produce pain, diarrhœa, and colic. Fruits imperfectly masticated and insalivated, received into the stomach with seeds, flakes of integument, &c., must excite the muscular action of that organ, and their own propulsion into the duodenum, before the necessary changes have been effected. Vegetable matters thus hurried into the small intestines, acting as foreign bodies, are well calculated to create the disturbances just mentioned, which have been too exclusively referred to their acidity. Escaping the chymous changes, they are not prepared for the duodenal changes. The development of gases, increased secretion from the alimentary tunics, and spasms, are the well-known consequences.

But some foods undergo fermentation in the alimentary canal, an important circumstance connected with proneness to acidity. The acetous fermentation has for a long time been recognized, but the lactic acid and viscous fermentations are also known to occur. Dr. Pereira states:

"Lactic acid is one of the substances derived, in part at least, from the food. The alimentary principles which yield it are sugar, dextrine (starch-gum), and

gum; those which furnish it with most facility are sugar of milk and dextrine. The acidity of stomach which is produced in some dyspeptics by saccharine substances arises from the development of lactic acid. Milk also is apt to disagree with such individuals, not only in consequence of the difficult digestibility of its fatty constituent (the butter), but also on account of the conversion of its sugar into lactic acid. Both bread and beer contain dextrine, and are the occasional sources of this acid. The tendency which some farinaceous substances, as oatmeal and potato-starch, have to cause acidity of stomach is owing, probably, to the formation first of dextrine, and afterwards of lactic acid." (p. 526-7.)

The production of this acid requires an azotized ferment, which is either contained in the food or derived from the stomach. Tea, coffee and acid juices sweetened with sugar, sweet wines and beer, are thus liable to become acid. Sometimes the process goes on to the viscous or mucilaginous fermentation, and during these changes carbonic acid and other gases are evolved.

4. *The tendency to putrescency* is another quality in food which affects the changes that may occur during digestion. The gastric juice counteracts this tendency, and when putrescent transpositions have actually set in, they are arrested and superseded by the action of this fluid. When the digestive powers are feeble, probably when the gastric juice is scanty in quantity or weak in quality, this tendency in organic matters may take its origin or proceed in the living stomach. It is necessary then to consider the liability of foods to putrescency. Animal substances are more prone to this change than vegetables; pork, as remarked by Dr. Davidson, is very apt to produce nausea and putrid eructations. Some of the ill effects of putrid matter received into the alimentary canal have been alluded to under the head of water, which, when it abounds in decomposing matters, so remarkably interferes with the digestive operations. We may state, in fine, that the usual chemical metamorphoses of organic matter are more liable to occur in certain states of the system, or of the digestive organs, than in others, and that they are superseded by the solutions or series of changes which constitute vigorous digestion in the healthy subject.

5. *Cookery, and the modes by which food is preserved*, here become subjects of medical and scientific interest. Numerous methods have been resorted to by mankind to preserve food; as, drying in the sun, or by artificial heat, smoking, salting, pickling, preserving with sugar, or with ice, or by the exclusion of the air. Although vegetables, as olives, mushrooms, and cabbages, are sometimes salted, animal food is the chief aliment submitted to this process. It appears to be essential that it should be done before putrefaction sets in, but the rationale of the process is by no means, even now, understood. Dr. Davidson states:

"That the animal fibre is hardened and condensed by the process of salting; and that it is impossible by the ordinary methods of maceration, and subsequent boiling, to remove the salt. These facts will readily account for the more difficult digestibility of salted meat. The fibres will thus be less easily masticated and dissolved in the stomach; and the extra quantity of salt being liable to excite thirst, a tendency to overcharge the stomach with liquids will frequently be induced. Salted meat and fish ought therefore to be taken in small quantities by those who have delicate digestive organs. Meat or fish, however, which has been slightly salted, only for a few days, is frequently rendered more tender and digestible by this short process. When kept for many months in salt, it often becomes tainted, is liable to prove unwholesome, or to produce scurvy if used without a sufficient quantity of vegetable food." (p. 91.)

It does not appear that any portion of nutriment is lost; Mr. Donovan having proved by experiment, that the juices usually expelled from meat during the process of salting are mere water tinged with blood; on the contrary, salting frees meat from that which would promote putrefaction. Dr. Pereira leans to the opinion that the preservative power depends, as in the case of some metallic salts, upon a chemical combination formed with the organic tissues. However this may be, hams, tongues, and salted and smoked flesh and fish, are less digestible than fresh food, in consequence of hardness and indissolubleness of texture. The process that hardens and preserves them from putrefaction, before they are taken into the stomach, keeps them from solution afterwards. Pyroligneous acid, containing a small portion of empyreumatic oil, is best adapted for pickling fish and other animal substances. According to Mr. Ramsay, quoted by Dr. Davidson, it is sufficient simply to dip herrings in the acid of 1012 density; and beef may be kept for six or seven months, without taint, by immersion in it for one minute. Another mode of preserving food is that by inclosure in tin cases from which the air has been exhausted, adverted to by Dr. Truman, who states that Sir John Ross and his companions "dined in the Arctic regions on Christmas day, 1831, on a round of beef, some veal and vegetables, all in perfect condition; which had been left with other stores belonging to the 'Fury,' in those high latitudes in 1823;" having been preserved by this method; and that other portions of food brought back to England in 1835, eleven years after it was prepared, remained perfectly good. But we may here remark, that although quite *fresh* as to taste, they have not the flavour or sapidity of really fresh meat. Preserved milk is extremely disagreeable, and in doses of a few ounces might serve as an emetic. Berzelius is quoted, to the effect, that sugar is more frequently employed than formerly for the preservation of meat, owing to a much smaller quantity than of salt being required to prevent putrefaction. Fish when gutted may be well preserved by spreading powdered sugar inside them. Many of the preservative processes, although unquestionably chemical, are not yet satisfactorily explained.

Dr. Pereira thinks the efficacy of sugar, in the preservation of fruits and some other vegetables, is not attributable to its preventing fermentation only, but that "it promotes the solidification of vegetable jelly."

The two-fold object of cookery is to please the palate and to increase the digestibility of food. Taste being intended, with other purposes, to assist in the selection of proper nutriment, when the diet has been habitually simple and the sense continues unalloyed, it is well calculated to insure that object; "for a good taste is the truest mark of good meat and drink, and all meat by how much more savoury it is, by so much the better it nourisheth," saith Roger Bacon. By luxury and abuse this sense is both refined and perverted. The natural desires and aversions belonging to it are to be observed only, for the most part, in infancy and very early childhood. The proper criterion of the qualities of food is afterwards little to be depended upon; we employ the most unwholesome and injurious materials; custom is law, the most acrid and nauseous substances become agreeable, and cookery, from a very simple, is rendered a very complicated art.

Whatever the estimation in which this art is held by the profession, the public, according to Dr. Truman, have appreciated its merits:

"The Romans paid great sums for cooks, who were slaves; and, if they became much celebrated in their vocation, always fetched a high price in the market. In modern times the professors of cookery are liberally rewarded for their services. The principal cook at one of the most celebrated club houses in London, is stated at one time to have had a salary of fifteen hundred pounds per annum—a much larger stipend than is enjoyed by any professor at either of the universities, and far exceeding the value of the greater number of church livings." (pp. 106-7.)

The gratification of a perverted taste, rather than the promotion of health, has ever been the primary inducement for this species of prodigality; and although our modern system of cookery may, upon the whole, excel that of the Romans in simplicity, Apician refinements have still their devotees.

Many of the mechanical and chemical changes effected by cookery are well explained in different parts of Dr. Pereira's volume. A diminution of the cohesive force, and a complete destruction of the organization of the compound aliments seems to be a principal object. The ordinary chemical transformations, by which organic matter passes progressively into the more simple combinations of inorganic nature, are arrested. But the more essential alimentary principles, as protein, oil, and probably gelatin, ought by no means to be changed. The facts of chemistry, as they at present stand, would seem to indicate that any process, having for its result a decomposition of these principles, renders alimentary substances not only indigestible but unwholesome, and destroys their nutritive powers. The processes themselves vary extremely in their effects.

A. *Roasting*, after drying in the sun, is probably the most primitive mode of dressing food, as it requires but little apparatus. Being effected at a very high temperature, a great deal of fat is drained away, and water evaporates; it is necessary to guard against the chemical changes which take place in the fibrin, oil, &c., when meat is overdone; and the juice of underdone meat is almost entirely aqueous. Well-done meat contains less both of water and fat, and is most digestible.

B. *Boiling*. This mode of cookery is considered upon the whole as best calculated to increase the digestibility of food. From vegetables it dissipates the volatile oils, as in the onion, and also gaseous fluids. The grains of fecula in amylaceous substances are broken or split up, the heat and digestive power of the human stomach being insufficient for this purpose. Boiling also coagulates the vegetable albuminous fluids. Gummy and saccharine principles are dissolved, and sometimes injurious principles are extracted; as, for instance, any portion of solanina that may be contained in the potato. In boiling this vegetable, the liquor in the cells and intercellular spaces is coagulated, the starch grains absorb water, swell up, and distend the cells, the albumen forms irregular fibres between the starch grains, and probably also covers them with a thin film, and the cells in which the starch grains are contained separate from each other. In mealy potatoes these changes are complete, in those that are waxy they are only partially effected, hence the latter are less digestible than the former. Analogous changes are effected by cookery in apples and similar vegetables. In boiling animal food, gelatin is dissolved, and part of the nervous fatty matter dissipated; the fatty matters melt, and except when inclosed in close cells, escape; liquid albumen is solidified, as in the egg; and flesh is rendered firmer. Unknown reactions take place during ebullition, and the decoctions, or broths and soups, contain creatine, osmazome, &c., but the essential nutritive prin-

ciples, fibrin, albumen, some gelatin, fat, and nervous matter remain. Mischief may be done by boiling if injudiciously managed. Albumen if boiled hard is less readily acted upon by the gastric juice and its digestibility is impaired. By prolonged ebullition at 220° Fahrenheit, as in Papin's digester, gelatin evolves ammonia, becomes syrupy, loses its property of forming a jelly, and very speedily undergoes putrefaction. Its nutritive properties are thus deteriorated if not destroyed, and it is rendered less digestible.

C. *Stewing* is in some respects a good method of preparing animal food, the whole of the nutritious matter of the meat being preserved, and its texture softened, but it is required to be done carefully. Soups, hashes, and even stews, if ill prepared, on account of the above-mentioned changes in the gelatin, and of the fat which they contain, are liable to become obnoxious to the digestive organs. It is proved also by Dr. Beaumont, that strong broths and soups, regarded as solutions of gelatin, and incapable of coagulation, have their digestion retarded, until, by the absorption of their watery parts, they acquire a more solid consistence.

D. *Broiling* is analogous to roasting, but effected more rapidly; the outside is liable to be charred, and the fat to be acted upon by the heat.

E. *Baking* differs from roasting, as retaining a larger proportion of the oleaginous principle, also modified by heat; hence baked meat is more liable to disturb the digestive processes.

F. *Frying* is of all methods the most objectionable, the fat in which the substance is placed requires a very high temperature to boil; this, and exposure to the open air, renders it rancid, and promotes the various chemical changes which we have before adverted to; the albumen, as of eggs in batter, is hardened, and the food rendered less easily miscible with the contents of the stomach, for which reasons omelets, pancakes, fritters, &c., are liable to prove indigestible. In fine, any operation in which fat is subjected to a high temperature becomes objectionable, especially where the digestion is weak. This abstract will amply illustrate the scientific relation of cookery to practical medicine, and fully proves, that the more simple processes only are essential. Good cookery in these points of view is conducive to health, and no doubt also to longevity.

These being the principal circumstances, which influence food as respects its digestibility, a remark or two is called for before we enter upon the matter of the second section of the present chapter. That hunger and thirst are not affections of the stomach alone, but belong to the whole system, is true, although many deny and others doubt it. Different states of the system are manifested by these sensations, and by the digestive powers, which in health, for the most part, correspond with the natural appetite. This we apprehend is what Dr. Pereira means by the digestibility of foods being affected by circumstances relating to the organism. We can but regard this as a deviation from the usual logical precision of the writer. Idiosyncrasies may affect the digestion of the most digestible foods, as in the case of the individual alluded to at page 246, in whom mutton acted as a poison. Yet the mutton is not indigestible. However, these states of the system legitimately belong to the inquiry respecting diet, and here we are led to what we believe to be one of the most important results of the discoveries recently made in organic chemistry. Hitherto practitioners in selecting, preparing, and portioning

food have for the most part aimed simply at the adaptation of its qualities to the processes of primary assimilation or digestion. The views promulgated by Prout, and more particularly those of Liebig and his school, have rendered more obvious this additional special object in all our dietetical rules,—the adaptation of food to the wants and exigencies of the whole system, or to particular structures, in secondary digestion or assimilation; or for the production of animal heat. Dr. Combe inculcates this adaptation as a principle of practice, but does not enter upon the chemical considerations. By defining more precisely the nature of assimilation, and the materials employed in the nutrition of tissues; and by determining the order and amount of their waste under the various circumstances of life, by means of an examination of the secretions and excretions; we may ascertain what alimentary principles are necessary to be supplied, and are also enabled to form some notion of the quantities required. It is not to be said that many very important results, applicable in the manner we have indicated, have yet been obtained. Still, we are assured that any system of diet which does not include a certain quantity of protein for instance, is inconsistent with that vigour of constitution by which man is enabled to labour in his various vocations; and a diet entirely divested of that principle, if continued for any length of time, is incompatible with the continuance of life. So also, by feeding animals with food having an abundance of the oleaginous principle, or of those materials which are easily converted into oil in the economy, keeping them at the same time in a high temperature and preventing exercise, we can promote the deposition of fat. These instances give countenance to the notion, that by continuing our investigations in this direction, we shall ultimately arrive at practical rules, by which nutrition may in a great degree be regulated, and by which questions respecting diet may be determined, appertaining both to hygiene and therapeutics.

II. OF THE NUTRITIVE QUALITIES OF FOOD. This subject having been fully considered in various parts of the volume, is only summarily treated of in this place. We have seen that aliments differ from each other enormously in the proportions of water to dry matter which they contain, and their nutritive powers must differ in a corresponding degree. The digestible part of the dry matter must be distinguished from that which is indigestible, as from lignin and chlorophyle. The dry material is divisible again into nitrogenized and non-nitrogenized principles:

> "For whether the views of Liebig as to the exclusively nutritive quality of nitrogenized foods be or be not correct, it cannot be doubted that the mode of nutrition of substances which are devoid of nitrogen must be different from that of bodies which contain it, and whose ultimate composition is identical with that of the living tissues." (Pereira, p. 453.)

The nutritive value of the nitrogenized part is said to depend upon the relative quantities of the compounds of protein, of gelatin, and other substances containing azote; and the efficiency and utility of the non-nitrogenized part in the production of animal heat, to depend upon the quantity of carbon and hydrogen, and the modes in which these elements are combined. These views, if correct, must originate an entirely new feature in practice. In prescribing dietetical rules, the whole amount of the various alimentary principles, and of the elements of food, that any particular diet may contain, respecting which an opinion has to be offered, must be considered. Looking to the general tendency of these doctrines,

the component parts of food must be studied in reference to the wants of the system, and to their nutritive and other effects, not only by the day or week, but for more lengthened periods ; and for the purpose of arriving at an opinion as to the suitableness of any given diet, we must determine the amount of carbon, hydrogen, nitrogen, protein, &c., which it contains. For this purpose accurate and well-constructed tables of the component parts of different kinds of food will prove extremely useful. Dr. Pereira's work contains several such, that at page 454 showing the average quantity of dry matter, moisture, carbon, and nitrogen, in various alimentary substances of commerce, may be particularly referred to.

III. Rules of Diet. A matter of some consequence is this : heedless persons, and those who are unwilling to have the gratification of their appetites controlled, or restricted within reasonable limits, frequently urge that dietetical rules are useless and unnecessary. They maintain this assertion by an appeal to their own experience, bringing in support of it the cases of individuals who have lived to a very old age, of whom Parr and Jenkins are cited as examples, although erroneously, as having done so without following any particular rules of health. Such arguments are frequently employed against the advice and prescription of the medical practitioner. In support of the same assertion also, a doctrine taught by Celsus is not unfrequently mistaken even by medical men ; "modo plus justo, modo non amplius assumere." But this is itself a rule, and as Hallé and others have interpreted it, by no means a sanction to excess or carelessness of any kind. Without lending any countenance to that kind of over-solicitous attention to the health which belongs to a luxurious age, as one of its refinements, it may be fairly questioned, whether any man above a certain class of society stands the slightest chance of attaining a good old age, who does not adopt rules of diet adapted to his age, particular constitution, occupation, and habits of life. As remarked by Sir J. Sinclair, savages have their rules, which are instanced in the self-denial of the American Indians, and of the ancient Germans, with a view to preserve their strength. " Peasants, labourers, and other hardworking people are placed in that situation where few rules are necessary, because their whole lives are a series of indispensable attentions to air, to exercise, to moderation as regards diet, drink, &c. . . . Rules they do observe, and for the most part every old person will be found to have his maxim of health." Plutarch, Galen, Cornaro, the Cardinal de Salis, all of whom attained a very advanced age, had their precepts of health, which are still extant. Not only for the purpose of relief or cure when the functions of life have become deranged, and the organs diseased, but even in the absence of these, for the preservation of health, no reflecting person can doubt the efficacy of rules. The mistake has been in endeavouring to lay down one principle for all mankind, and in prescribing general rules without a sufficient regard to individual constitutions.

IV. Quantity of Food. In the present state of our knowledge it is impossible to offer any fixed standard by which to determine the quantity of food required for any given individual. At the same time, the fact that medical and other official authorities are daily called upon to form diet-tables for large classes of their fellow-men in hospitals, prisons, workhouses, schools, and other public institutions, the importance of arriving

at the closest, possible approximation to such a standard becomes self-evident. But in pursuing this object we must be careful, as Dr. Davidson remarks, neither to lose sight of the many circumstances which modify the quantity of food required, nor to confound the quantity barely sufficient to maintain existence with that required to ensure vigorous health and longevity. Of the circumstances by which the quantity is affected, Dr. Davidson mentions two only—absolute bulk and exercise; in touching upon which, he alludes to the exceptional cases in which very slender men far excel their bulkier brethren in their daily alimentation. If Liebig's principles are to be depended upon, the amount of food required for any individual ought to bear a relation—1st, to his absolute bulk; 2dly, to his expenditure of vital force, as measured by the amount and kind of bodily and mental exertion which he undergoes, and the length of sleep; 3dly, to the expenditure of caloric as influenced by climate, season, clothing, artificial heat, and evaporation at the surface of the body; 4thly, to the growth and decay of the body in infancy and decrepitude.

A careful consideration of the doctrines propounded by Professor Liebig in his late work, and of a vast number of facts relating to the variable habits of mankind as respects diet, and of the effects of these habits, leads to the inevitable conclusion that, especially at the period of what may be called stationary adult age, as in different species of animals, so in different individuals and varieties of the human species, there exist fundamental differences in the constitution, as to the degree of rapidity with which the molecular changes take place in the vital tissues. These differences may be hereditary, constituting an important feature in the various temperaments, or they may be acquired during the periods of growth and early nutrition; but, whatever their origin, the more or less rapid metamorphoses which they imply characterizes in part the individual constitution. Without going so far as to agree with our friend Mr. Grisenthwaite, that there is no such thing as waste and reparation in the animal body, we think that in some constitutions the quantity of matter changed daily is very small indeed. In others it is much more considerable, and the differences between different individuals in this respect is much greater than has been imagined. One man, accordingly, requires a much larger quantity of the staminal or alimentary principles of diet than another of the same weight. This is true of the living structures as a whole, and even particular structures or tissues differ from each other in the same respect, laying the foundation probably for particular idiosyncrasies and habits.

The proportionate size of the different organs has also its influence over the quantity of food which an individual consumes. Whether from original conformation or from habits of abstinence or repletion, the human stomach varies greatly in this respect. Our own observation, in repeated post-mortem examinations, has convinced us that an enormously large stomach is by no means conducive to longevity. One of the largest we have ever seen was in a woman who had been an enormous feeder, was extremely fat, and died at the age of fifty-six, suddenly,—being anæmic, her muscles blanched, and having a large cholesteric calculus in the gall-bladder. We have observed the stomach of a very moderate capacity in old people. The absolute capacity of the stomach must have something to do with the quantity of food required, and although

the size of this organ cannot be accurately determined during life, its property of distensibility and the habits by which individuals act upon this property must be regarded in rules of diet. So also Dr. Davidson must be correct when he says:

"If one man have larger lungs, greater extent of skin, and more muscle than another man, he of the greater capacity must consume more carbon and nitrogen in the support of these functions; and hence will require more food containing these elements. Greatly, however, as some men differ from others in natural size, this is as frequently owing to accumulation of fat; and a man may thus nearly double his weight without increasing the capacity of his lungs, the size of his muscles, or the number of his cutaneous pores. Men who have thus increased their weight by corpulency do not, for this reason, require the same amount of food as those of similar size who are favoured with no such covering; and it is possible that the fat when once formed is allowed to remain partially dormant; and hence its actual weight is supported by less food than was required for its formation." (p. 27.)

It may here be remarked, that the cases of Cornaro and of the eastern Christians who retired from the persecutions to the deserts of Egypt and Arabia, living to a great age upon a few ounces of bread and herbs with the pure element for drink, are unquestionably instructive, and should not be lost sight of. But erroneous inferences have too frequently been drawn from them, and the sources of error are in the omission to allow for the effects of climate, age, exercise, or rest, and certain habits. Probably many of these individuals lived to be 115 or 120 years of age. The facts illustrate the principles developed by modern science: they took very little exercise, were at such an advanced age that the change of matter was extremely slow, and living in warm climates as saints and hermits are wont to live, in the shade and quietude of their caves and grottos, they required very little fuel for animal combustion. The diet suited for this combination of circumstances has been ill-chosen as the prototype of that which is necessary for mankind in general. The principles of science appear to be equally well borne out by the numerous instances of longevity in various parts of England, in which the diet has always been plain, simple, and abstemious, but as required by the greater coldness of the climate and the greater activity of its inhabitants, much more abundant than in the former cases.

These various circumstances serve to explain how it is that many individuals not only suffer no injury from a large quantity of food, but absolutely require it. How others, on the contrary, preserve health on the sparest diet. They show that one constitution demands more or less azotized or non-azotized or oleaginous food than another. By taking into consideration these modifying circumstances, many seeming discrepancies, respecting the diet employed by different people, will vanish. These circumstances determining the natural appetite ought to be taken into the account when vicious customs, or the causes of disease, or anything whatever, has occasioned the sensations no longer to be depended upon, and has given origin to the necessity for laying down some rule as to the quantity of food to be taken by an individual; and in the construction of dietaries.

The absolute and proportionate quantity of liquid necessary for the human constitution is another important consideration. Hoffman laid it down as a principle that three parts of the ingesta ought to be fluid in

proportion to one of solid; founding this upon the experiments of Boyle, who had ascertained that the blood contains three of fluid to one of solid constituent parts. Liebig makes the proportion of dry matter in the blood twenty per cent. Different writers on dietetics have taken very different views of this matter. To twenty-four ounces of solid food Cheyne allowed forty-eight ounces of fluid. Arbuthnot attached great importance to the principle of keeping the blood and other fluids in just proportion to the capacity and strength of the vessels, there being more danger from too small than from too great a quantity; but too much fluid weakens the activity of the digestive powers. Several authors have urged, we believe with propriety, the inconveniences of too little fluid, in producing costiveness, and leading to a faulty composition of the blood in the direction of a too great proportion of the red corpuscular part to the serum. The rule laid down by Hoffman is probably not far from right, but the proportion should be calculated upon the dry materials of food, not as it is commonly used. Thus dry rice when prepared for table combines with so much water that drink is hardly required with it; but bread, containing no more than forty per cent. of water, would require above its own weight, to be furnished either by the salivary glands or in the form of drink, to render it sufficiently fluid for the different stages of digestion, and for its conversion into chyle and blood. Any rule of this kind can be admitted only in a very general way, for when, from any cause, a greater quantity of fluid than of solid material is dissipated, as happens under a variety of circumstances, more fluid must be taken into the system. There are two classes of cases in which thirst is induced; those just mentioned; and where materials foreign to the blood, as poisons, or an excess of some of the healthy constituents of the blood, as of its salts, are received into that fluid. If the proportion of solid to fluid be duly preserved in the ingesta, and the food composed of wholesome alimentary principles only, in a fair proportion, the balance between the ingesta and the ejesta being moderately well preserved, the sensation of thirst and the necessity for large potations would seldom, if ever, recur. A close examination of the habits of diet among individuals in our own circle of observation, has led us to the conclusion, that the most robust and active consume from twenty to twenty-four ounces of dry material, and from sixty to eighty ounces of fluid daily. The quantity and proportion are subject to great variations, both within and without these limits; but the most frequent error committed, particularly among females, would appear to be an excess of liquid as compared with solid food. It is also unquestionably true, that an inordinate quantity of fluid received into the system is less injurious, in consequence of the almost incredible rapidity with which, under favorable circumstances, the excess transpires.

v. AGE. For reasons before alluded to, the proportionate quantity of food required by the system at different ages differs considerably. During the periods of infancy and growth, the increment of the tissues, the additional loss of caloric, owing to increased surface in proportion to the bulk of the body, and the very great comparative muscular activity in youth, are so many causes in operation to demand a greater proportionate quantity of nourishment. Physiological considerations lead us to infer that a greater proportion of water to dry matter, and of non-nitrogenized to nitrogenized aliment, is demanded in the earliest periods of life. The

nourishment requires also to be well adapted to the digestive powers, hence the earliest food is furnished ready prepared by the nurse. A principle laid down by Lord Bacon seems to apply to this part of the subject, that it is a general law of organized nature, for those species and individuals that are slow in attaining maturity to live the longest, nature finishing her periods in larger circles. If this be admitted, an over nutritious diet during the period of growth may have the injurious effect of bringing the constitution forward too rapidly. At the same time, every practical man will agree with Dr. Pereira that,

"Of the ill consequences of defective nutriment we have, unfortunately, too many instances continually presented to our notice. Irritable bowels or diarrhea, tumid abdomen, mesenteric disease, wasting, and fever, are the ordinary and obvious effects. They frequently follow the continued use of pea-soup and potato-stews, dishes which are in common use at poor-houses and other establishments for pauper children. Scrofulous and strumous diseases, marasmus, rickets, distortions, and pot bellies, so commonly met with among children of the poor, are referrible, in part at least, to food defective either in quantity or quality, or perhaps in both. I think it will be found that more than two thirds of pauper children are strumous. They derive this condition in part, perhaps, from hereditary tendency; but partly also, as I believe, from defective nutriment. To the same cause also is ascribable their inferior development. If the children in poor-houses be examined, they will be found for the most part, smaller and shorter for their age, more frequently distorted, and more readily fatigued, than the children of the middling and higher classes." (pp. 473-4.)

In adult life, in so far as the habits and locality of individuals are stationary, there is greater propriety in establishing fixed rules of diet than in the periods of development. A balance between decay and reparation exists, and probably during many successive years these processes are pretty uniform in degree. With change of locality, of season, and of habits, variations both in the quantity and quality of sustenance are required, but in the ordinary routine of life these may be kept within very moderate limits. As age advances the change of matter takes place more slowly; the powers of the body and the capability of labour and exertion, and in a proportionate degree the appetite for food decreases. We have estimated the quantity of aliment, and the proportion of dry to liquid material, consumed habitually by several old persons in good health. It varies from forty to sixty-five ounces, and the solids, but more particularly the nitrogenized alimentary principles, are more than proportionably diminished. An old lady of ninety, now living, walks about a mile daily, and enjoys uninterrupted good health with the possession of all her faculties; her daily diet is, upon an average, five ounces of solids and thirty-two ounces of drink, including eight ounces of porter and two glasses of wine. The cases of longevity published confirm these observations, and under every practitioner's eye, individuals of both sexes, who have arrived at a considerably advanced age, glide along the stream of life in the enjoyment of health, upon a very moderate supply of nutriment. So long as the supply and the expenditure as nearly as possible balance each other existence continues. It is a common expression applied to a bed-ridden octogenarian "he lives upon as little as would feed a sparrow." Let the balance be disturbed and existence is cut off. An increased quantity of nutriment destroyed old Parr, and two ounces in addition to his daily solid food nearly killed Cornaro. Many old men are prematurely cut off by exhaustion, "their spirits lead them beyond their

strength." If neither of these causes operate, the appetite for food gradually diminishes and the flame of life wavers and flickers and is finally extinguished, like the spark of a candle. These phenomena are beautifully developing themselves by the light which science is now casting upon the economy of animal life.

VI. CLIMATE AND SEASON. Great differences in the habits of mankind, as respects food, clothing, and mental and physical power and activity in the different countries and regions of the earth, and indeed the habits of animals, have been referred to, for the purpose of testing Liebig's doctrine of the source of vital power and that of animal heat, as contradistinguished,—the one being from nitrogenized compounds and the change of matter in the vital tissues, the other from the combustion of carbon and hydrogen. We have not seen the camel referred to in illustration of this subject. A large camel will carry from seven to twelve hundred weight on its back at the rate of thirty miles a day, subsisting for eight or ten days together upon dry and thorny plants and other scanty herbage. Here is a great expenditure of force, and we may presume little assimilation of nitrogenized food. If this were the whole truth it would militate against Liebig's views; but we learn that from about the period mentioned, more nutritious aliment is required, and that various artificial and, no doubt, nitrogenized preparations are given to the animal; the herbage referred to may contain a considerable portion of proteinized aliment; and it remains a question, to what extent the vital tissues become wasted under this expenditure of power. The provision for water is complete, the stomach being constructed with a cellular reservoir capable of containing a quantity sufficient for many days' consumption; and the boss on the back, which consists entirely of fat, supplies carbon and hydrogen; becoming wholly absorbed if the supply of food be not maintained under the fatigue described. Turning our attention to man:—The aboriginal inhabitants of the isles and warmer parts of America were remarkable for the smallness of their appetite for food; the earliest historians of the country describe their constitutional temperance as exceeding the abstinence of the most mortified hermits:—one Spaniard is said to have consumed more food in a day than ten Americans—their habits were those of indolence and total want of occupation. Hence,—debility of frame, a vacant inexpressive countenance, listless inattention, the mind being almost totally inactive, the emotions and efforts few and languid—the passion even of love almost inert. In the inhabitants of the more temperate regions of Chili and North America, and those districts where the people of America lived by hunting and were obliged to exert unusual activity, the appetite has sometimes struck observers as being voracious. Let us glance at the case of the Hindoo, which has been cited, although by no very philosophical writer, against the doctrine of the origin of animal heat and vital power. The Bengalee lives in a tropical climate upon a rice diet, and this, it is said, is essentially a carbonaceous diet containing very little nitrogen, yet for many months of the year the production of very little heat is required in his economy, and he goes through great muscular exercise. It can only be minds little imbued with the facts of science, which would employ these imperfect observations as arguments conclusive against the doctrines before us. As of the food of camel, it may be asked, what is the amount of the proteinaceous principle really contained in that of the

Hindoo? If the Bengalee actually consume a large quantity of fuel for organic combustion, does he not expend a great deal of caloric? Every possible means is resorted to by him for the purpose of reducing the temperature of the surface of the body and that of the surrounding atmosphere. If his food be highly carbonaceous it is also extremely aqueous, for he drinks much; he also wears little or no clothing, exposes himself much to the open air, and evaporation goes on at a great rate. Moreover, it is not to be doubted, that the food employed in hot climates frequently contains an excess of carbon and hydrogen, so far as the wants of the system are concerned. This is shown by a disposition to obesity. From Mr. Laird's narrative of an expedition up the Niger, we learn that all the party had a disposition to get fat, not eating half what they were accustomed to in England. So also Hindoos are apt to get fat on rice, and Negroes on the excessive use of sugar. This excess of carbon and hydrogen in the food also manifests itself in the diseases of hot climates. The Boothian, with other inhabitants of the polar regions, on the contrary, not only eats enormously and is accustomed from childhood to a large quantity of whale oil or blubber for food, but digs his grotto in the snow, and wears a double or triple garment of seal or reindeer skin,—he husbands most carefully his animal heat. We recommend those who may be sceptical on this point to apply to Mr. Richard King, of the Ecthnological Society, for an opportunity of wearing an Esquimaux dress for half an hour. We in England could not endure it in the coldest weather.

These facts apply to the different seasons and changes of external temperature. It is true that in our variable climate we do not find a whole population ravenous on one day, and totally incapable of consuming food on another, to correspond with every thermometrical and barometrical change of the atmosphere. The difference in the quantity of caloric extricated under these changes is frequently much less than would, à priori, be imagined. Warm clothing, warm beds, good fires, and heated apartments may equalize the summer and winter demand for the elements of respiration in our food. Diurnal changes may be too transitory to interfere with our habits of returning appetite and repletion. Yet common experience proves that much exposure to cold produces a necessity for increased muscular activity, and with this, a greater demand for food; and a sultry summer day diminishes the appetite and renders the digestion languid. Insufficient diet with exposure to cold, and excessive eating and drinking of hydro-carbonaceous aliments in hot weather, are equally liable to induce pathological conditions of the system, and fatal diseases.

VII. TIMES OF EATING. Some authors have advocated no fixed periods for meals, and have been in favour of leaving every one to eat and drink as his convenience or his sensations might dictate; but the principle of periodicity in the human constitution, if properly considered, is conclusive against the propriety of this practice. In infancy and youth, as regards time as well as quantity, it may be granted that regularity is less required, but in adult age and advancing years, the necessity of stated periods for meals is unquestionable. Darwin well remarked on this point, that the periods of hunger become catenated with certain portions of time or degrees of exhaustion, or other diurnal habits of life; and if hunger be not relieved by taking food at the usual time, it is liable to cease till the next

period, or other habits recur. There has been but little agreement as to the number of meals necessary. That the body may be regularly supplied with nutriment and fuel, the intervals should not be too great, experience having amply proved that injurious consequences result from inattention to this observance. That the food may be properly digested, the intervals should not be too limited. Dr. Beaumont's table, reproduced by Dr. Pereira, shows that different aliments require from one to five or six hours, and a moderate meal about three hours and a half for complete digestion in the stomach. This organ should remain empty for a time before it is again filled, as indicated by the fact that the appetite does not immediately return. The explanation which suggests itself to us of this circumstance is, that it is necessary the after stages of primary digestion in the duodenum should not be interfered with by fresh accessions of chyme before they are complete. These considerations enable us to arrive at some conclusions as to the proper number of meals. During the luxurious periods of the Roman empire, five and sometimes six were taken daily, and the more wealthy classes of old England had four and sometimes five meals a day. Long experience has demonstrated that this frequency of eating is inconsistent with the highest point of intellectual and physical vigour of which the human constitution is susceptible: not to say, with the continuance of health. It prevents the recurrence of natural appetite, and is usually associated with a pampered taste, to be satisfied only by a complication of food, condiments, physic, and poisons. The most robust among the peasantry and labouring population continue so on three good meals a day, taken at regular intervals. It is also a fact that some of the most healthy and vigorous people, particularly in the middling and upper classes of society, habituate themselves for years to but two substantial meals daily. Observation convinces us that among the latter, the sum of vital force expended in bodily labour is less, although that expended in mental exertion through the involuntary organs, as in the cares and anxieties of life, may be greater than in the former class. In the letter from a physician, recorded by Sir J. Sinclair, it appears that the very old men in the highlands of Scotland, of whom M'Alpine reached 119 years, took but two meals a day; a great many of the poorer Irish divide their daily food into two portions. We think upon the whole, that Drs. Pereira and Davidson are judicious in determining that three meals in the twenty-four hours is the best general rule to be laid down for the population of this kingdom; admitting, however, of numerous exceptions, as for infancy and old age; and as respects the former, not only are a greater number of meals required, but from the moment of birth, the natural tendency to periodicity should be respected in the customs adopted by the nurse, in feeding both herself and her infant.

VIII. Habits in reference to Meals. The propriety of taking exercise or rest of body and mind immediately before, during, and after meals, is an important consideration. The system ought not to be in a state of excessive fatigue or exhaustion at the period of taking a heavy meal, and deep thought during meals is most inimical to the digestive process. Dr. Pereira shows that there has been much difference of opinion upon the subject of sleeping after taking food; he leans in favour of doing so, after a principal full meal, as dinner. Active exercise, it is stated, is prejudicial to digestion, and various evils have been traced to

it, as diseases of the heart. The habit of animals has been used as an argument; but we may ask, because the dog or the serpent take immense quantities of food at long intervals, gorging themselves to repletion, and then lie down and sleep, is man also to do so? According to Seguin's experiments, when exercise is taken after a meal, more than double the quantity of carbonic acid gas exhales from the lungs, showing the increased combustion of fuel and production of heat under the combined influence of food and exercise. Dr. Beaumont ascertained that moderate exercise heightens the temperature of the stomach and promotes digestion in a very marked degree. Are we prepared to say this is injurious? The evils of violent exercise, or of intense thought, with an over-distended stomach, are not to be doubted. But we are inclined to respect Aph. 36, sect. 3 of Sanctorius, "That is the most healthful amount of food, when after eating the body performs whatever it has to do with the same agility as if it were fasting." So also Cardan: "The true measure of eating and drinking is, that a man shall feel no fulness or weight in his stomach, but shall be able to walk or write immediately after meals:" and Lessius, "He who eats or drinks such a quantity as renders him unfit for any exertion of the mind to which his profession calls him, has certainly exceeded, and ought to retreat. And he who in bodily labour or exercise was active and nimble before meals, if he becomes heavy and dull after meals, has certainly transgressed; for the true end of eating and drinking is to refresh, and not to oppress the body." Aphorisms, which we must confess, notwithstanding they are contrary to the practice of the majority of individuals of the upper classes, who will plead personal experience to contradict them, being confirmed very strongly by the experiments to which we have referred, we believe to be framed on a rational foundation.

IX. Dietaries. The introduction of this chapter, which contains the various hospital, prison, and workhouse scales of diet, constitutes a peculiar, and it must be admitted a very important feature, in Dr. Pereira's work. There can be no doubt, that if preceding writers had paid more attention to this part of the subject, much misery, disease, and loss of life would have been prevented. A consideration of the effects of dietaries on large numbers of individuals is calculated to bring our principles to the test, but, on examination of the chapter before us, we are bound to say that the data it contains, by which conclusions might be arrived at upon some of the more important points, are extremely few and defective. This is in part attributable to a circumstance before remarked on, the want of a philosophical foundation, upon which questions respecting diet might be determined. The time can scarcely be said to have passed, when one learned physician who had allowed his patient a little stewed beef, felt aggrieved at his brother in consultation unwittingly ordering a mutton chop. An unlucky apothecary allowed his patient an oyster or two.—"Oysters!—Mrs. General G——, I tell you oysters are your destruction," exclaimed the physician on the following day. One of the old school, now dead, had ordered a patient bread and water for breakfast; after enduring this for some time, the lady complained that she could not go on, and must have something stronger. "Then, madam, you may add a little toast to your water!" was the answer. The truth is, our prescriptions have been too frequently based upon some real or imaginary trifling difference in the digestibility of foods, or given at

hazard, without any reference to the amount and kind of nourishment required, or to the proportions of the different alimentary principles, or the special objects to be served in the economy. Upon equally vague and defective principles have dietaries been framed for public institutions, and most deplorable, as is now well understood, have been the consequences.

In the dietaries for children we observe that the quantity of substantial food for growing boys, for instance, sanctioned by " le ministre de l'Intérieur" in the public institutions of Paris, greatly exceeds and in some instances doubles that allowed in our own establishments. In the Foundling Hospital in London, the substantial diet for a boy of eight years old, is upon an average a little under 19 ounces daily, to which is added nearly 14 ounces of milk. In the Foundling and other hospitals of Paris, for a boy of the same age, the substantial food is about 30 ounces, to which is added about 30 ounces of broth, soup, and wine. The diet for the younger children in the Foundling is not so good, but after nine years of age it is more nearly equal to that of other metropolitan institutions. In connexion with this subject we have been furnished with an important fact by Dr. G. O. Rees, assistant-physician to Guy's Hospital. The average weight of a given number of boys in the above hospital, whose ages are under nine years, is six pounds each, less than that of the same number of boys of the same age in the Caledonian Asylum; the amount of nutritious food allowed in the latter establishment being much greater than in the former. There are no doubt other causes in operation, but the fact deserves the closest attention.

In the English navy each man is allowed daily from about forty to forty-five ounces of solid food, greatly varied, with a gallon of beer and some tea and vinegar. Dr. Pereira considers this "most ample, though not excessive." There are some anomalies in the different scales:—eight ounces of fresh vegetables, for instance, are made equivalent to twelve ounces of flour. The former contain, probably, some saline matter or other principles essential to nutrition, which are absent in the latter; but, measuring the nutritive powers by the whole amount of dry matter, eighty-six, instead of eight ounces, would be equivalent to the given amount of flour; and measuring them by the quantity of nitrogen afforded, 105½ oz. would be the equivalent. Notwithstanding this, the quantity of food being abundant and the quality good, a high degree of health is enjoyed in the royal navy.

On the dietaries for paupers we meet with the following announcement: "It has been very properly stated by the Poor Law Commissioners, that in the dieting the inmates of workhouses, the object is to give them an adequate supply of wholesome food, not superior in quantity or quality to that which the labouring classes in the respective neighbourhoods provide for themselves." Six dietaries have been adopted by the commissioners for use in poor-houses. The average amount of solid food daily, for able-bodied paupers, is about 25½ ounces for males, and nearly 22 ounces for females. Bread, cooked meat, and potatoes, form the most important items; beer is not permitted unless specially ordered by the surgeon; and at sixty years of age and upwards, 1 ounce of tea, 5 ounces of butter, and 7 ounces of sugar per week, in lieu of gruel for breakfast, may be allowed if deemed expedient. In justification of this scale of diet, we are informed that an agricultural labouring man consumes pro-

bably no more than 20 ounces of solid food daily—bread and meat—but including not quite an ounce of the latter. And, also, that at a meeting of the chairmen and vice-chairmen of the twelve East Kent Unions, it was unanimously declared the diet answered well, no alteration being desirable.

Dr. Pereira remarks of the prison dietaries, "It will be perceived that the conclusions which the inspectors have arrived at accord with the principles which I have advocated in this work." The diet is regulated according to the length of imprisonment, sex, discipline, and the additional punishment of hard labour. The solid food for prisoners at hard labour, for terms exceeding three months, is, for males, a little more than 36 ounces, and for females a little more than 26 ounces.

To a certain extent only, as it appears to us, have the inspectors of prisons acted upon the principles embodied in the work we have been reviewing; founded on the chemistry of organic life as at present understood on the continent, and in this country, by a large and increasing class of the medical faculty. In this point of view, the "Reasons of Dissent as to the Scales of Diet," assigned by Mr. F. Hill, and very candidly inserted by Dr. Pereira, are deserving of attention. Mr. Hill urges that there is great want of information as to the quantity and kind of nutriment required for health under the various circumstances of life, and also as to the quantity and kind of nutriment contained in aliments. He objects also to the principle of giving prisoners less food for the sole reason that the imprisonment is to be of shorter duration. Viewing this subject as a whole, we may add, that we are *very* sceptical as to the sufficiency of the pauper dietaries. In the first place, the whole of these dietaries are not so much varied as with advantage they might be. At the Pentonville prison, Dr. Rees employs cocoa and treacle, and we know no valid reason why these and many other cheap commodities should not be introduced into all prisons, but more particularly into poor-houses. The quantity of food for able-bodied paupers is upon the whole less substantial than that allowed by Cheyne, after the example of Cornaro, which has been regarded by all the most judicious writers as too spare a diet for this climate. Dr. Starke starved on 26 ounces of bread per diem. As to the quantity of food obtained by agricultural and other labourers, we have to remark, that in the county of Wilts, according to Mr. Chadwick's report, the average age attained by the labourer and his family is thirty-three years, by the farmer forty-three years, and by the gentry, fifty years. In Whitechapel the average age attained by the class of mechanics and their families is twenty-two years: tradesmen twenty-seven years: the gentry forty-five years. A general law of this kind appears to obtain. Several causes for this are in combined operation, but we apprehend no doubt can exist, that food, deficient in quantity, or injudicious, or bad in quality, is one of the principal. "The labouring classes," says the Report before us, "become old the soonest, and the effects of the unfavorable influences in the adolescent and adult stages is shown in the smaller proportion who attain extreme old age; and also in the periods of the deaths of heads of families of this class." (p. 161.) In the union poor houses several of the most efficient causes of premature decay and death, as close habitations and uncleanliness, exposure to vicissitudes of temperature, malaria, inordinate labour, the

use of intoxicating liquors, &c. &c., are done away with; so that, except so far as diet is concerned, this law ought to cease, or to reduce itself to a very narrow scope. Accurate statistical records and time will prove to what extent this takes place. The same test will exhibit the frequency and effects of diseases of debility. In the mean time, it behoves those in authority to consider well their scales of diet, since these must become more than ever amenable for the contingencies of the union poor-house.

The best of the dietaries for able-bodied paupers of the male sex affords about 8 ounces of carbon daily, and for the females 6¼ ounces. We do not know how Dr. Pereira reconciles his approbation of these dietaries with his statements in the first part of the work, as to the quantity of carbon consumed by individuals under different circumstances. There is no great amount of hydrogen in excess in the different scales; accordingly, if anything like a pound of carbon, or its equivalent of carbon and hydrogen, is necessary, in this cold and variable climate, for the maintenance of the proper temperature of the human body, these dietaries must be most defective. The carbon is considerably less than that allowed for the prisoners in the house of arrest at Giessen, who are deprived of all exercise. (Pereira, p. 12.) In reference to this point, it is not absolute starvation that we have to look to as the most obvious and immediate result of the system of diet, but the occurrence of diseases which supervene a low power of resisting the effects of atmospheric vicissitudes. Artificial warmth might in part obviate this tendency, but the temperature of the union workhouse, and the day and night clothing employed, would not place its tenant upon a par in this respect with the individual living at ease in a tropical climate; and if it did, the continual exposure of the respiratory organs to the action of the external air, must, as we should imagine, be attended with the results to which we have referred.

The fact of inherent differences of constitution in different individuals, is calculated to show the utter absurdity and cruelty of restricting a body of men, whether paupers in a workhouse, or the inmates of a prison, to a uniform minimum allowance of food. This has been found out experimentally, to the bitter cost of large classes of our fellow-creatures. At the same time it will no doubt be held to be impracticable in our institutions, to apportion to each individual the quantity of food which the special circumstances of his constitution may require. How, it may be asked, are we to judge of the weight and bulk of each individual, of his habits of bodily and mental activity, sleep and watchfulness, of his respiratory organs, and powers of producing heat, of all the circumstances of external temperature and artificial warmth, of his previous habits, of the relative size of his organs, and of the degree of molecular activity in his vital tissues? all of which you tell us are in complicated relation with the quantity and quality of the food which his system demands. What are the authorities to do in this difficult case? A question, as it appears to us, admitting but of one answer, embracing two particulars. 1. The allowance must be far above the minimum. 2. Such medical officers only should be appointed in whose judgment and general qualifications the strictest reliance can be placed, and upon these officers must devolve the duty and must rest the responsibility of apportioning the diet in every case, under certain limitations, and not in cases of sickness and infirmity only. There is also great reason in Mr. Hill's suggestion that *dif-*

ferent scales of diet should be adopted, and that prisoners, and we may add paupers, should be classified from time to time by the governor and surgeon according to the scale of diet which his system requires. Again, with his other qualifications, every surgeon of an union should be competent to determine the qualities and nutritive value of the food supplied, that is to say, to subject it with accuracy to chemical tests, and both to ultimate and proximate analysis. According to the present low scale of diet this is doubly necessary. If the object be to preserve health and to prolong life, these considerations are of the first importance. On the score of expense, these views may be said to be impracticable; this in the face of facts cited and referred to in this article is lamentable. The variety and the abundance of food suited to the human constitution, produced by the land, and dispersed through the waters on the face of the globe, seem to forbid the idea to be entertained. Even Mr. Hill objects to the admission of luxury into prisons, (p. 423;) but in carrying out christian principles it cannot be avoided—a keen appetite, well satisfied, is the greatest of all luxuries. We must not enter upon this as a question of political economy, but the propriety of starvation as a punishment for three days (Class 1, p. 495) may fairly be doubted. Many of those who become amenable to this law are already half-starved wretches, who have never known three continuous days of good meals, at regular intervals, with moderate labour. It might on physiological grounds be better to feed a prisoner well, even of this class, and to trust to moral and religious influences to bring him to a sense of right and wrong. And as to the other classes, it may be fairly admitted, that in so far as a race of hardy felons and paupers, in perfect health, attaining a great age, is an incumbrance to the state, it would be an evil, but there still remains the question, why should they be an incumbrance?

X. On the Dietetical Regimen suited for Disordered States of the Digestive Organs. This is the last chapter of the work, and little more than a summary of some of the topics examined in former pages, as cookery, times of eating, the quantity of food taken at one meal, conduct before, at, and after eating, and the relative digestibility of different compound aliments; with exemplifications of the proper kind of food for dyspeptics. The following shall be our last quotation:

"Bulk is perhaps, nearly as necessary to the articles of diet as the nutrient principle. They should be so managed that one should be in proportion to the other. Too highly nutritive diet is, probably, as fatal to the prolongation of life and health as that which contains an insufficient quantity of nutriment. It has been ascertained that carnivorous animals will not live on highly concentrated food alone." (p. 525.)

The importance of food and diet as regards etiology has, we conceive, been well established by our previous quotations and comments. Interspersed in these volumes we find various illustrations of the practitioner's dependence upon it, not only in a prophylactic but in a remedial point of view. The use of water in the shape of slops, diluents, &c. to quench thirst, to augment the fluidity of the blood, to promote secretion, and probably "to promote the conversion of uric acid into urea" in fevers and acute inflammatory disorders; of a *dry* diet to keep down the volume of the circulating organs, or to repress secretion, or to prevent thinness of the blood, as in valvular diseases of the heart, aneurism, &c., (Pereira, p. 84) for instance. To correct languor, hypochondriasis, and melancholia,

and many of the complaints of the studious and sedentary, and of the idle and luxurious, Cheyne and Cadogan prescribed abstinence and labour. "Live upon sixpence a day and earn it," said John Abernethy. In the chapter on dietaries Dr. Pereira describes: 1, Full, common, or meat diet; 2, Animal diet; 3, Vegetable diet; 4, Spare or abstemious diet; 5, Fever diet; 6, Low diet; 7, Milk diet; 8, Dry diet; subjoining the Sick diet-tables of the metropolitan hospitals and other institutions. Each of these diets have their separate utility in the treatment of disease, which is very briefly described by the author. Besides these, we find mention made of several specific objects to be attained by means of aliment, as in the use of brown bread and oatmeal porridge in habitual constipation; of distilled water in the oxalate of lime diathesis; of cod-liver in rheumatic, gouty, and scrofulous diseases, and affections of the skin; of animal food and gluten bread in diabetes; and of lemon-juice and the potato, by virtue of their citric acid, as antiscorbutics. But on the dietetical treatment of the sick, the three volumes before us contain very little information, nor is there, as we conceive, a work extant, in which this highly important part of therapeutics has been properly or adequately treated of.

It has been the object of this article to show the extent, and to inculcate the importance of every part of the subject of diet, to all classes of the community, and as a fundamental department of his scientific inquiries, to the medical man in particular. We shall conclude with the remark, that it has a higher bearing than that which relates to the perfection of the physical frame of man. The moral and intellectual being is much more dependent upon it than the superficial observer is aware of; more, we will say, than the physical frame itself. The parent, of either sex, entails upon the offspring physical imperfections of constitution, by errors, excesses, or defects of diet and nutrition; the helpless being, from the earliest periods of its existence, being subject to painful where it ought to experience only pleasurable sensations. The infant at the breast receives a vitiated or an impoverished diet, unsuited to its digestive powers, or to the demands of the assimilating processes, inducing fretfulness and peevishness among the earliest complications of the affections then developing themselves. As childhood advances, the expanding mind becomes habituated to feelings of discontent, and the finer shades of mental character are superseded by others that naturally result from disappointment, continually flowing out of factitious and real wants unsupplied. The Sanatory Report to which we have before referred contains conclusive evidence, that a deteriorated physical condition is inimical to moral and intellectual cultivation. The teachers of the pauper children at Norwood aver, that the intellects of such children are torpid, it is difficult to gain their attention or to sustain it; they are irritable and bad tempered as compared with well-grown healthy children. A comparison was made between the progress of two sets of children in Glasgow, the one from the wynds, the other from a more healthy town district, and of a better physical condition. Although the former were placed under the best master, his pupils proved unable to keep pace with the better bodily conditioned children. Physical and mental aberration and degeneration proceed in parallel lines, till man finds himself an adult, the creature of

artifice, and the slave of sensuality; or mentally and physically, the degenerate son of poverty.

Innumerable are the effects of evil habits of diet; of luxury in the rich, superfluity in the middling classes, want in the poor, and intemperance in all. Cheyne said of strong liquors, "besides producing diseases, they enrage the passions into quarrels, murder, and blasphemy. In those who have never known them, the sensations are more exquisite, the passions calmer, the appetites more controllable, and the health more uninterrupted." Dr. Pereira records that the temper of the leopard changes for the worse by being fed with two meals instead of one a day. We advocate not exclusive opinions. The temper of a gentleman of a sanguine temperament, who for some months lived upon vegetables, became much less excitable; and an individual of an opposite temperament was observed during the time he lived on a reduced diet to be more irritable. Irascible passions may undoubtedly be frequently subdued by attention to diet; and Galen was not presumptuous when he desired the teachers of philosophy to send for his treatment all persons of bad character. The intellectual faculties require for their due performance a proper supply of good blood to the cerebral organs. Instances might be quoted in which a diet of vegetables alone has appeared to be most conducive to the higher powers of the mind; instances also of the converse might be adduced. If we were taxed to enumerate those causes that counteract the beneficial influence upon society, of education, and the general diffusion of knowledge, we should class the errors committed by the community in reference to food, and the nutrition of the body, as the most prominent among the number.

The benefits that may accrue to mankind from the exertions, beyond all praise, of Father Mathew, the apostle of *total abstinence* from the *most* seductive and pernicious of the inventions of luxury, it is impossible to divine. We may refer to the testimony of Mr. and Mrs. Hall in their work upon Ireland, to prove, that the humbler classes, are already gathering in a rich harvest of blessings from this regeneration. Individuals moving in higher circles, known to ourselves, who, objecting to the "pledge," have strictly followed out the principle, have also distanced evils with which they had been too long familiar. We have not yet heard of an instance attended with injurious consequences. The hygienic influence of the system adopted by Priessnitz is no mystery,—and an ample quantity of simple nutritious food, in the diet of Gräfenberg, rejecting every superfluity,—with the advantage of exercise in a fine air, amid delightful scenery,—have at least as much influence as *water*, in the cures that have been effected.

A most fallacious argument, adduced by the interested against moderation and temperance, requires a word of remark. Man, it is frequently urged, advances in years and attains a gray old age, without exercising any restraint upon his inclinations, and with no other guide but his natural appetites. Men who have been all their lives addicted to the use of large potations of spirituous fluids, are said to have reached seventy and even ninety years; and those who have partaken freely from their infancy of all the luxuries of the table, to have enjoyed an equally protracted existence. But the converse of the picture should be brought into view: the years cut short by gout, rheumatism, hepatic pulmonary and renal affections, heart diseases, imbecility, palsy, and apoplexy, and

a host of effects leading to one certain goal, a premature decay both of the mental and physical being. Is the real period of man's probable existence, and the distinction between age and decrepitude ever considered? Instances of extreme longevity occur in all countries. In England, during the last century, several persons died more than 130 years old, and there are authentic records of many *hundreds* of individuals who have lived more than a century. The votaries of good living may think that an existence thus protracted is undesirable. Let them read Southwood Smith's Philosophy of Health: they will there find, admirably described, the distinction between advancing life, a period to which an indefinite number of years may be added, and decrepitude, which no human power can protract: and they will also find, eloquently displayed, the undoubted truth, that enjoyment is the only condition of life which is compatible with a protracted term of existence.

We have entered more fully than usual into the details of this subject, that we might carry conviction to the minds of our readers, of the importance which must attach to the possession of some definite principles, by which, as practitioners, we may be guided in laying down rules of diet. We cannot say that we regard Dr. Pereira's treatise either as complete or faultless. It is a compilation with an original arrangement of the matter. Many of Liebig's beautiful theories are introduced as extracts, without much and sometimes without any commentary; and notwithstanding objections raised against some of these, it is, as before intimated, essentially the application of the organic chemistry of Liebig and of the continental school, to the subject of diet. Many of our readers will regard the principles it comprises as too chemical, and we do not ourselves vouch for the stability of all the doctrines advanced, however cautiously, by the author. The numerous repetitions met with is a great fault, and the tables of analysis might have been concentrated with advantage, and placed together at the end of the work, or at the end of each section or chapter. Thus, the long table from Dr. Beaumont is first introduced piecemeal, and then again entire, under the head of "the digestibility of food." All this serves to increase the number of pages, or to exclude important matter, which otherwise, as we think, might have been introduced. The chemical annotation is also faulty. The chapter on alimentary principles might be curtailed with propriety, and a part of the matter transferred to that on compound aliments. Notwithstanding all this, the work is not only an excellent text-book to be placed in the hands of students, but one absolutely necessary for the use of every practitioner at the present moment, whether he has kept pace or not with organic chemistry in its recent rapid progression; it is calculated, by enabling the regular practitioner to found his directions for diet in some measure on a scientific basis, to prevent the abuse of the public mind by the empirical and frequently pernicious or ridiculous precepts of homœopathists, hydropathists, and charlatans. Dr. Pereira's original plan was to treat the subject in a more full and systematic manner; and we still think that a work embracing the principles of dietetics more extensively applied, the natural historical details more judiciously selected than we find them in Dr. Davidson's duodecimo, and the interesting facts so far as they are authentic, which Dr. Truman delights in, with their philosophical interpretation, and all that is important relating to the subject of food and diet, is still a desideratum in medical literature.

Art. II.

A Practical Treatise on the Diseases of the Testis, and of the Spermatic Cord and Scrotum. By T. B. Curling.—*London*, 1843. 8vo, pp. 542. With Illustrations.

This is not a book written to order, to satisfy the necessity for printing periodically experienced by the brethren of the Row; but is, we find from the author's preface, the legitimate and spontaneous issue of personal observation and research, aided by ample opportunities and abundant experience.

"My attention having been directed in the year 1835 to the subject of the morbid anatomy of the testis, I have since lost no opportunity of studying the pathological changes to which this organ is liable. My inquiries have been much facilitated by a connexion formed very early in professional life with a large hospital and with a dispensary, which have supplied me with abundant means of acquiring a practical knowledge of the diseases of this important organ. The result of these investigations having furnished facts which appear of some interest and value in relation to certain affections of the testis, but imperfectly understood, and to the treatment generally of the disorders of this part, I have ventured to submit them to the consideration of my professional brethren." (Pref. p. i.)

In addition to the practical improvements thus announced, the author's "Researches on the structure of the testis," have led him "to describe certain parts rather differently from other anatomists," and have enabled him "to throw some light on the interesting subject of the descent of the testis." (Pref. p. ii.) In fact, the present work does not appear as a mere digest of the labours and experience of others, but avowedly professes to augment our anatomical, physiological, pathological, and practical knowledge respecting the organs and the diseases it treats of, and it is our duty to present such an analysis of it to our readers as may enable them to judge of its general character and particular merits.

The First Part of Mr. Curling's work is devoted to the anatomy of the scrotum and testis, and to some considerations on the functions of the latter organ. It would be tedious as well as unnecessary to examine this portion of the book in detail, and we shall merely advert to a few points that seem to require notice.

The scrotum. There is considerable difference of opinion respecting the anatomy of the parts intervening between the skin and the tunica vaginalis. Winslow and his successors described them as consisting of—a very delicate layer of cellular membrane; the dartos; a tolerably thick layer of cellular membrane; and the cremaster muscle Many, perhaps most modern anatomists, for example, Blandin and Cruveilhier, consider that the dartos alone intervenes between the skin and the cremaster, but recognize between the cremaster and the tunica vaginalis, the common fibrous sheath or tunic of the cord and testicle, derived from or continuous with the transversalis fascia. Sir A. Cooper, though he does not mention the last structure, and denies the existence of the dartos, nevertheless agrees with those authors as to the number of parts that may be discriminated by dissection between the skin and the tunica vaginalis; and he states these to be the cellular tissue of the scrotum, the superficial fascia of the cord, and the cremaster muscle. Velpeau adopts a kind of middle term between these last two views, and enumerates the dartos,

the superficial fascia of the cord, the cremaster, and the common tunic of the cord and testicle. We might readily extend the list of conflicting authorities, but we believe we have noticed those that are most important,—enough at least for our purpose. As to the structure and connexions of the various tissues of the scrotum, we need only notice the various opinions that have been advanced respecting the dartos. Winslow considered it a true muscle, Cruveilhier thinks it a peculiar contractile tissue intermediate between cellular membrane and muscular fibre. Boyer seems to regard it as a fibrous membrane; Meckel and Sir A. Cooper say it is mere cellular tissue, or in other words deny its existence as a distinct and independent structure; and Velpeau ingeniously reconciles these discrepancies by saying, that it is indeed cellular membrane, which is however occasionally transformed into true muscle. Some, with Cruveilhier, consider the dartos as single; others describe it as being double, but, so far as we know, all who admit its existence have hitherto agreed that it forms the septum scroti. As to its extent and attachments, some say it is continuous with the superficial fascia, others that it is connected with the aponeurotic structures of the penis and of the perineum; and others again describe it as attached to the rami of the os pubis and ischium.

Mr. Curling's account of the anatomy of the scrotum is somewhat different from any of those which we have thus briefly passed in review. He describes the subcutaneous layers of the scrotum as consisting of the dartos, a large quantity of cellular tissue, the superficial spermatic fascia, and the cremaster muscle. We do not think that this description is accurate. In the first place, as our author admits the existence of the dartos as a separate structure, we do not know where he finds "the large quantity of cellular tissue" between it and the superficial fascia of the cord, for the only *reticular* tissue that exists in the scrotum in *large quantity*, is that which is known as the dartos. A second error, as we think, and a more important one, consists in the omission of any mention of the deep fascia of the cord or common envelope of the cord and testicle, an omission into which Mr. Curling has probably been led by the authority of Sir A. Cooper. We notice this not merely because it is an anatomical oversight, but because the structure in question is of some pathological importance, inasmuch as it is frequently the seat of encysted hydrocele of the spermatic cord, in the adult at least. We may just observe, that Mr. Curling says nothing respecting the extent or the attachments of the dartos. He mentions Mr. Bowman's opinion, that it is muscular and composed of "unstriped elementary fibres," and says, we think erroneously, that the septum scroti is formed, not by the dartos, but by the cellular membrane beneath it.

We are not exactly certain whether Mr. Curling claims originality in his views respecting the cremaster muscle, though his language leads us to suspect that he does. He says, (p. 5,) "this muscle is usually considered and described as a part or process of the *oblique internus abdominis*. It has, however, separate attachments; and its office and connexions are so entirely distinct, that it ought to be regarded as an independent muscle." And at p. 31, after again alluding to M. J. Cloquet's view that the cremaster muscle is formed by the testicle drawing down, during its descent, the inferior fibres of the lesser oblique

muscle, he says, "this view is, as I have shown elsewhere, clearly erroneous and inaccurate." Now, the refutation of Cloquet's view has not, as this language implies, been reserved for our author; its inaccuracy has been shown long since. Cruveilhier, for example, has expressly contradicted it. (Anatomie Descriptive, t. ii, pp. 58 and 727.) Mr. Curling's description of this muscle is precisely similar to that of Sir A. Cooper, save that Sir A. Cooper describes its internal origin as attached, on the inner side of the abdominal ring, to the lower part of the sheath of the rectus muscle, while our author describes it as attached to the os pubis, as well as to the sheath of the rectus; but the internal attachment of the cremaster to the os pubis is distinctly mentioned by Scarpa and others.

The testis. The description of the testicle is clear, copious, and accurate; and embodies the researches of Krause, Lauth, Müller, and Gulliver, respecting the minute anatomy of the secreting structure of this organ. In a note (p. 8) it is said, from a misprint no doubt, that Cruveilhier estimates the thickness of the testicle at three lines, it should be eight lines. Meckel states the average weight of the testicle to be four drachms, and Sir A. Cooper about an ounce. Mr. Curling says, "I have found the mean of these two estimates, viz. six drachms to be the ordinary weight of the sound testis of a healthy adult." (p. 9.)

Descent of the testicle. Mr. Curling has advanced some new views respecting this very interesting and obscure subject, which we shall allow him to explain in his own words. After describing the situation of the testicle in the fœtus and the general configuration of the gubernaculum testis, he proceeds thus:

"The lower part of this process (the gubernaculum) passes out of the abdomen at the abdominal ring, and diminishing in substance and spreading, terminates in three processes, each of which has a distinct attachment. The central part and bulk of the gubernaculum is composed of a soft, transparent, gelatinous substance, which, on examination in the microscope, is found to consist of nucleated cells, the primitive cellular tissue: this central mass is surrounded by a layer of well-developed muscular fibres, which may be distinguished by the naked eye, and which can be very distinctly recognized in the microscope to be composed of 'striped elementary fibres.' These muscular fibres, which may be traced the whole way from the ring to the testis, are surrounded by a layer of the soft elements of the cellular tissue, similar to that composing the central mass; and in the same way as the testis the whole process, except at its posterior part, is invested with peritoneum. On carefully laying open the inguinal canal, and gently drawing up the gubernaculum, the muscular fibres may be traced to the three processes, which are attached as follows: the external and broadest is connected to Poupart's ligament in the inguinal canal; the middle forms a lengthened band, which escapes at the external abdominal ring, and descends to the bottom of the scrotum, where it joins the dartos; the internal passes in the direction inwards, and has a firm attachment to the os pubis and sheath of the rectus muscle. Besides these, a number of muscular fibres are reflected from the internal oblique on the front of the gubernaculum. It thus appears that the attachments of the muscle of the gubernaculum, and those of the cremaster in the adult are exactly similar. I have succeeded in tracing out the former before the testis has descended, at different stages of the process, and immediately after its completion; and of the identity of the two no doubt can be entertained. (pp. 30-1.) ..... In the passage of the testis from the abdomen to the bottom of the scrotum, the gubernaculum, including its peritoneal investment and muscular fibres, undergoes the same change as that which takes place in certain of the *rodentia* at the access of the season of

sexual excitement; the muscle of the testis is gradually everted, until, when the transition is completed, it forms a muscular envelope, external to the process of peritoneum, which surrounds the gland and front of the cord. As the testis approaches the bottom of the scrotum, the gubernaculum diminishes in size, owing to a change in the disposition of its cellular elements; the muscular fibres, however, undergo little or no diminution, and are very distinct around the tunica vaginalis in the recently descended testis. (p. 33.)......the middle attachment of gubernaculum, which may be traced to the dartos at the bottom of the scrotum, gradually wastes away, and soon becomes indistinct, though slight traces of this process often remain to the latest period of life. Thus, after death, in dragging the testis of an adult out of the scrotum by pulling the cord, the lower part of the gland, which is uncovered by serous membrane, is often found connected to the bottom of the scrotum by a band of firm and dense cellular tissue......This band is the remains of the middle attachment of the gubernaculum. In cases in which the testis has been retained in the groin, I have traced a cord of dense tissue from the gland to the lower part of the scrotum." (pp. 33-4.)

Mr. Curling then proceeds to deduce an explanation of the descent of the testicle.

"Hunter, Meckel, and others," he observes, "came to the conclusion that the muscular fibres of the cremaster are insufficient to bring the testis lower down than the abdominal ring, and complete the descent. They were not, however, acquainted with the attachment of this muscle to the pubis external to the ring, or it would be difficult to understand why Mr. Hunter, after arriving at the conviction that the cremaster passes up to the testis whilst in the abdomen, chiefly from analogy, was not induced by the same process of reasoning to conclude, that a muscle capable of drawing down the testicle in animals would be adequate to accomplish the same purpose in the fœtus. The necessity for some active agent to effect this change in the latter would appear to be greater even than in animals, since, in the usual position of the fœtus in utero, the passage of the testis is contrary to gravitation, and unaided by the movements of respiration. Now, when we consider the attachments and connexions of this muscle in the fœtus, the perfect condition of its fibres as ascertained by microscopical examination, and the circumstance that there are no other means, no other motive powers by which this change can be effected, or in any way promoted, I think there is no reason to doubt that the cremaster executes the same office in the human embryo, as that which it undoubtedly performs in certain animals at a particular season. The fibres proceeding from Poupart's ligament and the obliquus internus tend to guide the gland into the inguinal canal, those attached to the os pubis to draw it below the abdominal ring, and the process descending to the scrotum to direct it to its final destination. As the descent approaches completion, the muscular fibres which perform so important a part in it gradually become everted; and, instead of drawing down the testicle, acquire the new functions of elevating, supporting, and compressing it." (pp. 35-6.)

This account of the structure and attachments of the gubernaculum testis explains the descent of the testis in a very ingenious and satisfactory manner. The great difficulty has always been to understand how the testicle was conveyed from the external abdominal ring into the scrotum; for though its descent to the ring might be referred, either to the slow contraction of the gubernaculum itself, or to the action of the muscular fibres that exist on the anterior surface of that organ, the latter of these influences could clearly carry it no further than the ring, and neither the prolongation of the gubernaculum to the bottom of the scrotum, nor its muscular structure internally were suspected, until discovered by Mr. Curling, to whom the greater credit is due as the structure of these parts and the descent of the testicle have been anxiously investigated by the most eminent anatomists.

We pass over the sections on the "*spermatic fluid*" and on the "*functions of the testis;*" the latter of which, at least, might have been omitted, as everything of practical importance connected with the subject is fully discussed in other parts of the work.

PART SECOND treats of *Diseases of the testis*, and the first chapter is devoted to the consideration of *Congenital imperfections and malformations*, under the several heads of *Numerical excesses and defects*, *Deficiencies and imperfections of the vas deferens*, and *Imperfect descent of the testis;* to which last subject we shall confine our observations on this chapter.

Mr. Curling is of opinion, from his own observations, "that if the descent (of the testicle) does not take place within a twelvemonth after birth, it is rarely or never afterwards fully and perfectly completed without being accompanied with rupture." (p. 68.) This opinion has been entertained by several authors, and when we look to the mechanism of the process it might be anticipated that a late descent of the testicle must be always followed by rupture, but it is a curious fact that this is by no means uniformly the case, even when the descent is postponed to a very late period. Malgaigne, for example, (Anat. Chirurg., t. ii. p. 266,) mentions the case of a boy, aged thirteen, who being thrown from a height of seven feet, the left testicle suddenly descended from the abdomen, but was not followed by a rupture.

Mr. Curling considers at some length the causes "of a failure in the descent of the testis," (p. 68,) which have not, he observes, been much investigated, and could not have been satisfactorily explained, while the agency by which the descent of the organ is effected was unknown. Our author's views respecting that process, together with the facts that "there are few muscles in the human body whose development in different individuals varies in a greater degree than that of the cremaster," and that "a due supply of nervous energy is often denied to other muscles during fœtal existence, and is the cause of the deformities in the feet and other parts with which infants are often ushered into the world," lead him to conclude that "we may fairly enumerate paralysis and defective development of the cremaster amongst the causes of the imperfect descent of the testis." (p. 69.) But he admits, with preceding writers, that adhesion of the gland to a portion of intestine is an occasional cause, as is also a contracted state of the external abdominal ring, especially when the organ is retained within the inguinal canal.

The condition of the undescended testis is a subject of considerable importance, inasmuch as, to quote Sir A. Cooper's words, "when the testis remains within the abdomen, it makes a strong impression on the patient's mind that his virility is lessened or destroyed. In a case of this kind I have known the unfortunate subject of it commit suicide." (Obs. on the Structure and Diseases of the Testis, part i, p. 45.) It is, we believe, pretty generally known that the case alluded to by Sir A. Cooper does not stand alone, at least we have always understood that one who promised to become a distinguished ornament of our profession committed suicide, though his virility was unimpaired, in consequence of labouring under this infirmity—if infirmity indeed it can be called.

Some of the older authors, to whom we cannot at the moment refer, conceived that the detention of the testicles in the abdomen augmented

the virile powers, because of the parts being nourished and comforted by the warmth of the viscera. We cannot say who first impugned this consoling doctrine, but Hunter promulgated a directly contrary opinion, and his authority led to a pretty general belief that an undescended testicle is imperfect both in its organization and its functions. Mr. Curling considers this question, and we shall endeavour to follow him as briefly as may be.

Mr. Curling observes that the only case Hunter met with in which both testicles remained in the abdomen contradicted his own doctrine, as the virility of the individual was unimpaired. He also quotes Mr. Owen's commentary on Hunter's views, in which it is argued that the retention of the testicles within the abdomen cannot necessarily impair their efficiency, inasmuch as they constantly remain in the abdomen in many animals, while according to Hunter's own observations, their continuance in the abdomen in those animals in which they naturally pass into a scrotum "is accompanied only with a difference of shape and size," which, Mr. Owen remarks, "may influence the quantity, but not necessarily the quality of the secretion." It is, however, important to ascertain not merely from analogy, but by actual examination, how far the organization of the human testicle is influenced by being retained in the abdomen. Mr. Curling says but three cases have been hitherto recorded in which the anatomical condition of a testicle situated within the abdomen is described. In the first of these (J. Cloquet, Recherches sur les Causes et l'Anat. des Hern. Abdom.,) the gland was of its natural shape and *size*. In the second, (Cooper, op. cit. p. 45,) the testicles, which were both within the abdomen, were nearly, *if not quite*, the natural size. In the third, (Bright, Guy's Hosp. Reports, vol. ii, p. 258,) the retained gland was much smaller than natural, but its structure was perfect. Mr. Curling has had an opportunity of adding a fourth case to this list; in it, the right testis of a lad named J. West, aged sixteen, "situated about an inch and a half above the internal ring, was very small, not larger than that of a child two years of age, and on cutting into it the gland presented the granular appearance usually remarked at that early period. . . . the left testis which was in the scrotum was four times the size of the right." (p. 75.) We are not aware of any other cases, besides those mentioned by Mr. Curling, in which the precise condition of the testicle has been particularly described; but we must observe that Sir A. Cooper, in his account of the case above referred to, says generally that he has examined *others*, several we must presume, in which, as in it, the testicle "was nearly of the same size as a healthy testis when deprived of its tunica vaginalis; and the seminiferous tubes were full of semen," that is to say, the organs were unquestionably fit for procreation.

It has been already observed that virility was unimpaired in the case of non-descent of both testicles seen by Hunter; but on the other hand, Mr. Wilson mentions a case in which a young man similarly affected, had never evinced any sexual passion. This, Mr. Curling observes, is, so far as he can ascertain, "a solitary case of impotency occurring under such circumstances, and when we consider how various are the defective sexual power, this single instance, and the case of West, *are scarcely sufficient* to confirm the opinion of John Hunter, or to invalidate the general conclusion that retention of the testes in the abdomen does not incapacitate them from performing their proper functions, a point on

which it is obviously of great importance that surgeons should have it in their power, to give a confident and satisfactory opinion, and relieve the anxiety of parents." (pp. 75-6.)

This passage affords an example of the want of precision with which Mr. Curling sometimes writes, which occasionally renders it somewhat doubtful what his real opinion finally is. The weight of the evidence adduced, and the general tenor of Mr. Curling's reasoning on that evidence go to invalidate Hunter's opinion, yet here and there something is said that insinuates a doubt. Thus in the passage last quoted, the cases referred to are said to be *scarcely sufficient* to confirm Hunter's opinion, a phrase which implies that they are very nearly sufficient to do so. Again the author says, "in *all cases* of imperfect descent of the testis, whether the gland be arrested in the *abdomen* or groin, it is *nearly always* small in size," though in two of the only four dissections referred to, this was not the case, "and it cannot be doubted, that the natural situation of the testis is the one best adapted for the efficient performance of its function." (pp. 81-2.) Finally, however, Mr. Curling states that "the surgeon may confidently assure his patient that the detention of the testes in the abdomen is perfectly compatible with his virility, and in cases where there are no external marks of effeminacy or other grounds for suspecting impotency, and the patient is subject to erections, I should not consider the imperfection as offering any bar to marriage." (p. 82.)

We may perhaps be thought by some to have devoted too much space to the discussion of this question, but its importance we think warranted us in considering it rather fully; especially as Mr. Curling's work, which merits, and we are satisfied must command, a very extensive circulation, though it contains all the elements for coming to a right conclusion respecting it, and ultimately inculcates that conclusion, yet does so with a degree of hesitation and doubt, which we cannot perceive any grounds for.

When a testicle is permanently arrested in the inguinal canal or in the groin, it is unquestionably in a worse predicament than when it remains within the abdomen, as in the former situation it is liable to pressure, friction, blows, or other injuries which may impede its nutrition or cause the supervention of inflammation or other disease. Hernia too very usually accompanies a late descent of the testis. For these reasons, says Mr. Curling, "and as the descent is seldom perfectly accomplished when delayed beyond the age of ten or twelve, I think it becomes a serious consideration in cases where the gland does not make its appearance till this late period, whether the well being of the patient would not be best consulted by our employing some mechanical means to prevent the escape of the organ from the abdomen." (p. 80.) We shall presently endeavour to estimate the value of this suggestion, but must first advert to the much more important case, where a hernia occurs while the testicle is within the abdomen.

Mr. Curling does not give a very definite opinion as to the treatment that should be adopted in this latter case. He first mentions an interesting case, in which a child a year old, neither of whose testicles had descended from the abdomen, had an inguinal rupture at both sides: Mr. Curling being consulted "in accordance with the usual practice, objected to the application of any truss." This advice was followed, and

when the boy had attained the age of eight, the rupture on the right side had disappeared spontaneously, that on the left protruded very slightly, but there was no appearance of either testicle. Respecting this case Mr. Curling takes occasion to say,

"If it be granted that a testis situated in the abdomen is in a better position than one placed in the groin, that it is productive of less inconvenience, and exposed to fewer causes tending to impair its structure, that its subsequent descent, if it ever takes place, is frequently if not commonly attended with rupture, it must, I imagine, be admitted, that the advice usually given in these cases is unsound and injudicious. Had a different practice been adopted in the case of the boy just described, and a truss applied, I cannot think it would have contributed much more to his health and comfort, than leaving him for several years subject to all the inconveniences and dangers of an unrestrained double rupture." (p. 81.)

Mr. Curling however, as is too much his habit, clogs this opinion with qualifying expressions sufficient to insinuate distrust as to the general applicability of the practice he seems to prefer, but yet not sufficient to suggest rules for guidance in particular cases. Thus he follows up the passage last quoted, by saying "it must not however, be inferred, that the arrival of the testicle in the scrotum is a matter of slight importance," and a few lines further on adds, "when *there is no reasonable hope* of the descent into the scrotum being fully and completely accomplished, and when the patient is exposed to the serious inconveniences of hernia," a truss should be applied. And thus the reader who takes Mr. Curling for his guide is left in doubt as to what practice he should adopt in a case of the kind now under consideration. The passage first quoted, in which the case above mentioned is commented on, would induce him to apply a truss to a boy a year old; the last two extracts would incline him to wait until there "was no reasonable hope" of the descent of the testicle occurring, but he will in vain search for any interpretation of the vague phrase "reasonable hope," for any statement of the period when hope ceases, or of the signs by which we may know that it has not fled.

It is not easy to explain satisfactorily why many most eminent and truly excellent surgeons have recommended the practice of allowing a patient to encounter all the perils of an unreduced hernia, with the view of favouring the descent of a testicle. Pott says "I do not know of any particular inconvenience arising from the detention of a testicle within the cavity of the belly," (Surgical Works by Earle, vol. ii, pp. 235-6,) but most inconsistently tells us elsewhere, "while there is a testicle in the groin, *or even within the abdomen*, ... the application of a truss would be *highly improper*, for fear of bruising, *or of preventing the descent of the gland*," (Id. Op. vol. ii, p. 117;) that is to say, the rules of surgery and of common sense are to be violated, by permitting a patient to labour under a dangerous disease, for, as we shall presently see, the chance of remedying a condition of things not attended with "any particular inconvenience." Sir A. Cooper, we have seen from pages already quoted, describes an undescended testicle as scarcely, if at all, diminished in size or impaired in organization, and therefore fit for procreation, but of "a testis late in descent, *and protruded by a hernia*" he says, it "is *often lessened in bulk*, but the testis on the other side, with this diminished organ is sufficient for the procreation of children." (Op. cit. p. 46.) We may just observe, that "the testis on the other side" *without* the di-

minished organ would be quite sufficient for procreation, but our object in quoting this passage is to show that Sir A. Cooper unquestionably intimates that a testicle protruded by a hernia is very likely to be in a worse condition than if it remained quietly within the abdomen, and yet he adds "in those cases in which the testicle has not descended at birth, it often happens that a hernia becomes the means of its descent; and such hernia should remain without a truss being applied, until it has brought down the testis into the scrotum." (p. 46.) Even those who adopted Hunter's views were not quite consistent in their anxiety for the descent of the testicle, for as they attributed its late descent, and still more its complete detention within the abdomen, to an original imperfection of the organ, instead of attributing the supposed imperfection to its residence in the abdomen, it is not easy to see why, on their own hypothesis, they should object to a hernia being retained by a truss, on the grounds that the exit of the testicle would be thereby prevented.

Mr. Curling, as we have seen, questions the propriety of the practice against which we contend, but not, we think we have shown, either with sufficient precision or sufficient decision. Mr. Curling must be aware that he could have fortified his views (which however he omits doing,) by high authority. Not to multiply references we shall merely cite Boyer, (Traité de Malad. Chirurg., t. viii,) and Jobert (de Lamballe), (Traité théor. et pratique des Malad. Chirurg. du Canal Intestin, t. ii, p. 338,) who recommend us to apply a truss to a reducible hernia when the testicle is in the abdomen, with the view of obliterating the hernial opening, without being at all uneasy respecting the testicle, which will perform its functions just as well in the abdomen. If a testicle descended with a rupture, and was adherent to the intestine we believe no surgeon would hesitate to return both into the abdomen if he could effect it, and the liability to such adhesion constitutes another objection to permitting the protrusion of a testicle by a hernia, for if the ring will not permit the return of the gland, the state of the patient is then truly miserable. Another point, to which Mr. Curling does not allude, though his own case above adverted to affords an example of it, is, that after exposing the patient to all the mischiefs of an unreduced hernia, the rupture may fail to bring down the testicle, in which cases, of course, a very serious evil is incurred without obtaining the very questionable advantage for the sake of which that evil has been inflicted. Mr. Curling's proposal to apply a truss on the inguinal ring, when a testicle has not made its appearance at the age of ten or twelve, (years we presume, though this is not specified,) is, so far as we know, original, and we need scarcely say that we think it a very judicious suggestion, but if this precaution is to be adopted, we think it should be taken at a very much earlier age, for we trust we have shown that the great point in those cases is, not to procure the descent of the testicle, but to prevent or remedy rupture.

The only real disadvantage of imperfect descent of the testicle is its liability to injury if in the groin; while, if in the abdomen, disease originating in the testicle may extend throughout that cavity, "there is no shut sack, no distinct tunica vaginalis restricting the limits of inflammation when set up." (p. 84.) This evil, however, cannot for a moment be put in competition with those of an unreduced hernia. Mr. Curling gives two cases as examples of its occurrence. The subject of one of these

was a lad aged ten who died with symptoms of acute peritonitis, five days after he had received a kick in the right groin.

"Marks of extensive peritonitis were found throughout the whole of the abdominal cavity, the viscera being coated with lymph, and a turbid serum abundantly effused. In the right iliac fossa, just beneath the peritoneum were seen two small abscesses of recent formation. An atrophied testis was discovered close to the external ring, amongst a mass of cellular tissue, infiltrated with pus and lymph." (p. 85.)

The second case is inconclusive, as the patient was affected with hernia, and recovered, so that its real nature was not ascertained.

In the section on *Diagnosis in cases of imperfect descent of the testis,* our author notices the rare case of a testicle arrested at or just below the external abdominal ring, and complicated with hernia and a collection of fluid in the sac. This case, the most difficult of the kind that can occur, has been particularly described by Dupuytren. The diagnosis can only be determined by carefully considering the distinctive characters of the tumour, and these are not specified in the present work. There is a fluctuating and perhaps a transparent tumour; on gentle pressure the fluctuation disappears, and the tumour diminishes from the return of the serum into the abdomen; the swelling then feels more solid, and further pressure reduces another portion of it with the characteristic sensation felt during the reduction of a hernia; and there then remains a rounded tumour which may be irreducible, or may ascend some way in the inguinal canal, pressure on which causes a peculiar painful sensation. In one case of this kind, (except indeed that no intestine was down,) Dupuytren found the diagnosis extremely difficult; Mr. Curling refers to this case, but does not mention the circumstance which rendered the diagnosis so difficult, and which constitutes the entire interest and peculiarity of the case; though the inguinal canal was open, and there was consequently a communication between the tunica vaginalis and the peritoneum, yet the fluid could not be returned in the abdomen, because the epidydimis though not adherent to, lay against and blocked up the inguinal ring, and on pressure was so firmly impacted in this situation, that no fluid could pass up. In every case of imperfect descent of the testicle, examination of the scrotum of course greatly facilitates the diagnosis. Some cases have been already published in which error resulted from neglect of this examination, and Mr. Curling knows of two instances in which an inflamed testicle situated in the inguinal canal was mistaken for strangulated hernia, in consequence of the absence of the testis from the scrotum having been overlooked. Indeed in every case of doubtful tumour in the vicinity of the genital organs the scrotum should be suspected, for the testicle, as we shall immediately see, occasionally, though very rarely, makes its way into strange situations.

Descent of the testis into the perineum. This abnormal situation of the testis occurs very rarely. Mr. Curling mentions the two cases observed by Hunter, and a third communicated to him by Mr. Adams, which are all, he says, with which he is acquainted. How many cases of the kind may be on record we cannot say, but we are only aware of two others, which are briefly noticed by Vidal (de Cassis), (Traité de Patholog. Externe, t. v, p. 655,) and it is worthy of remark that the irregularity affected two brothers, but was not hereditary; the misplaced testicle was in both instances somewhat atrophied.

A still rarer *error loci* of the testicle, if the phrase will be pardoned, is its descent through the femoral canal; Mr. Curling does not mention this unusual occurrence, but two examples of it, at least, are on record. One is mentioned by Vidal, (loc. cit.,) in which the testicle descended directly through the femoral ring, though the patient was also affected with an inguinal rupture on the same side; the other is reported by Eckardt, (Loder's Journ. für die Chirurg. ii Bd. i Stff., p. 187,) in it the testicle first descended through the inguinal canal, and having been returned by the patient into the abdomen, subsequently made its exit through the femoral ring.

The next chapter is on *Atrophy of the testis*, which is treated of under the heads *Arrest of development* and *Wasting*. Our observations on this chapter shall be few, as a very full consideration of the circumstances under which this affection occurs, leads Mr. Curling to conclude, with every previous writer on the subject, "that we have little power by any mode of treatment, to promote the development or prevent the decay of this organ," as its causes "are commonly the result of actions beyond the surgeon's reach or control," (p. 111,) unless indeed when the affection arises from pressure, or impeded circulation, caused for example by an ill-made truss.

It has been said that atrophy of the testicles may be caused by long continued chastity. Mr. Curling at first seems to discredit this notion, as he says that he is not aware of any sufficient authority for the allegation that persons who strictly adhere to their monastic vows become thus affected, and also shows—what has a most important bearing on the question—that deficiency or obliteration of the vas deferens in man and in animals, by no means commonly produces wasting of the gland, (pp. 102-3.) The very next sentence, however, implies that he has seen cases in which disease caused atrophy of the testicles, as it introduces a case, which Mr. Curling says "*is the most remarkable case* I have met with of wasting of the testes, apparently from long-continued inaction," (p. 103. The case is that of a man who had laboured for at least twelve years under disease of the urino-genitory organs, so very severe that he must have been incapacitated for sexual connexion for many years, "both testes were atrophied, being scarcely larger than hazel nuts, but the tubular structure was still apparent. There was a small hydrocele connected with the right testis." (p. 104.) Mr. Curling infers that the protracted sexual incapacity of this individual must have caused "the atrophy of the testes, since the organs were not otherwise diseased." (p. 104.) This case, we think, is a very slender foundation for a doctrine, which is very liable to abuse, and might be perverted into both a temptation to and a plausible excuse for immorality. Independent of the influence of any exhausting chronic disease in diminishing the volume of the testicles, the alterations in the urino-genitory apparatus in this individual, diseased kidneys, contracted bladder, the prostate or multilocular purulent cavity, two urinary fistulæ, the urethra completely impervious and obliterated in one part, stricture in others, abundantly account for the wasting of the testicles, as these organs are very commonly subjected to repeated attacks of inflammation during protracted disease of the urethra, and inflammation is perhaps the most frequent

cause of their atrophy. The existence of a hydrocele confirms this view, if indeed confirmation of it were wanting.

Mr. Curling notices inflammation as the most frequent cause of *complete* atrophy of the testicle; but he does not mention, to use Sir A. Cooper's words, "the danger of severe and repeated attacks of inflammation," which do not indeed commonly lead to perfect wasting, but frequently "are followed by a considerable diminution of the virile power, leaving the testicle lessened in its size, and its capacity for secretion." (Op. cit. pt. ii, p. 25.) This is of practical importance, for example in the treatment of a case of disease of urethra, say stricture, in which there is a great disposition to inflammation of the testicle, the utmost care should be taken to prevent its supervention, and when it does occur, to remedy it as promptly and energetically as the condition of the patient will allow.

Several cases have been observed in which the testicles wasted after injury of the head. Mr. Curling refers to those recorded by Larrey, Hennen and Lallemand, and adds a fifth which fell under his own observation. In it, as in the others, the injury had been inflicted at the posterior part of the head. Virility was quite lost, the right testicle was no larger than a horse bean, the left was much diminished in size, and tumours resembling mammæ were developed on each side of the chest. The skull at the occiput seemed somewhat flattened.

Injuries of the testis are treated of in the third chapter. The section on *Contusion* leaves nothing to wish for, but *Punctured and incised wounds* are disposed of somewhat too briefly, a rare fault, by the way, with the author.

Formerly wounds of the testis were regarded with too much apprehension, latterly their bad consequences are perhaps rather under-rated. Mr. Curling, we are free to admit, is right in saying that these wounds "are not in *general* followed by severe results," and that "the fact that they commonly do well, should be remembered by the surgeon, that he may not too hastily despair of saving the gland in incised wounds even of a severe character." (p. 114.) But the entire subject is disposed of in nine lines, five of which we have quoted; and there is no mention of the mischief that occasionally though rarely follows these wounds. We suspect that trocars are thrust into testicles oftener than is perhaps thought. Usually all goes well, but inflammation and suppuration sometimes follow, and of this we have seen two instances. Vidal (de Cassis) candidly states, that having a patient at la Charité affected with a tumour of the testicle, the nature of which was very obscure, he punctured it with a very fine trocar. Inflammation set in the next day, and ultimately killed the patient. Mr. Curling does not warn the student, that in incised wounds of the testicle the tubuli seminiferi project through the lips of the wound, and might be, indeed have been, mistaken for a slough or flocculi in the pus. Even J. L. Petit fell into this error, but luckily discovered in time that he was removing the proper substance of the testicle; but others have actually emptied the tunica albuginea.

We pass over the chapter on self-castration, to the fourth, which is devoted to a much more important subject.

Hydrocele. Mr. Curling commences this chapter with some observa-

tions on the effects of inflammation of the tunica vaginalis on the testicle; he adverts to the opinions of Gendrin, that inflammation of the tunica vaginalis extends to the epidydimis, but not to the body of the testicle, and accounts for this circumstance, by the sub-serous cellular tissue transmitting the inflammation to the epidydimis, while the tunica albuginea arrests its progress to the body of the gland. The alleged fact of the exemption of the body of the testis from any participation in inflammation of the tunica vaginalis, rests, according to Gendrin, on one case. Mr. Curling adopts this view, but does nothing to confirm it, though he had abundant opportunity of satisfying himself on the subject. He refers to a preparation presented to the museum of the College of Surgeons by Sir W. Blizard, which shows the effects of inflammation of the tunica vaginalis caused by the application of caustic for the cure of hydrocele, and he himself examined three testicles shortly after the tunica vaginalis had suffered from acute inflammation, and also nine at a remote period when adhesions only were found, but in every instance he merely describes the condition of the last-mentioned membrane, and says nothing of the condition of the testicle itself. We notice this the more particularly because Sir A. Cooper says "in general, I observe that when there are marks of inflammation *upon the tunics* of the testis—such as, for example, adhesion, the *substance of the gland itself is changed*, the septa are much more apparent than natural, the seminiferous tubes appear to be less in number, are undoubtedly much reduced in size, and many become cords instead of tubes." (Op. cit. pt. ii, p. 23.) These appearances are unquestionably the effect of inflammation propagated to the body of the testicle; and even if this be denied it matters not, we still have the coexistence of adhesion of the tunics and *same prejudicial* influence exerted on the structure of the gland. That such inflammation is not always so propagated is undoubted, but Gendrin and Mr. Curling are wrong in generalizing from a single case, as Sir A. Cooper has *generally* observed the very reverse of the position they maintain. Mr. Curling says that Gendrin's theory "explains the fact that after inflammation of the tunica vaginalis excited by injection, the body of the gland is rarely found to suffer." (p. 121.) That it often, perhaps usually, escapes, and very rarely suffers in any important degree, we admit, but this immunity depends on the moderate amount of inflammation commonly excited. This is not a barren discussion, for in the prevalent rage for deviating from the common track, the operation by injection has not escaped, and some of the old operations for the medical cure of hydrocele, such as incision and the seton, have been proposed as general methods of treatment, chiefly on the grounds that they are less liable to fail than the operation of injection. This cannot be denied; but the knowledge of the fact that severe inflammation of the tunica vaginalis extends to and damages the structure of the testicle, renders it imperative on the surgeon, independently of the propriety of sparing the patient suffering and protracted confinement, to treat hydrocele by the mildest means usually adequate for the purpose.

Mr. Curling first gives the history of *Simple hydrocele of the testis*, for thus he designates what is commonly called hydrocele of the tunica vaginalis. We greatly prefer the latter term, both as being generally received and as conveying a correct notion of the nature of the disease. The symptoms of hydrocele are first described as they ordinarily occur,

their occasional variations are then stated, and some of the characters of the affection are noticed in the section on its diagnosis: but, notwithstanding this methodical arrangement, some omissions have struck us. The only exceptions mentioned to a hydrocele being "an oval pyriform tumour," with "a smooth and even surface," are the occurrence of the hour-glass contraction and the irregular shape consequent on adhesion of the testicle to the front of the tunica vaginalis; and there is no notice of the inequalities that occasionally exist on the surface from the tissues of the scrotum yielding unequally to the pressure of the fluid, nor of the deviations from the pyriform shape that sometimes occur, such as the tumour being nearly spherical, or its transverse exceeding its perpendicular diameter. The directions for detecting transparency are by no means adequate to guard the inexperienced against error. We are told that "the mode of making the examination generally adopted is to darken the room and place a lighted candle between, so that the tumour may be interposed between the eye and the light." (p. 138.) But if certain precautions are not adopted, such an examination might very readily mislead. Unless the tumour is firmly grasped behind so as to make it project anteriorly and isolate it from the other side of the scrotum, transparency when it exists may very readily be overlooked; and to avoid falling into the opposite error, it is requisite, especially if the tumour is small, to place the edge of one hand on the front of the tumour to intercept the rays of light, and even then if the hand is placed too obliquely, if the fingers are not firmly applied to the scrotum and to each other, or if either the light or the eye is placed too high, illusion may occur from the light being deflected over the tumour and reaching the eye. Mr. Curling recommends, in cases in which it is difficult to detect transparency, either from the thickness of the parietes of the sac, or from the dark colour of the fluid, the use of "a wooden tube, about three quarters of an inch in diameter, open at both extremities, (or in its absence a roll of writing-paper,) one end being placed against the swelling opposite the light; the surgeon, on looking through the other, can observe the transparency with great advantage. (pp. 138-9.) Such an instrument has been already proposed by Segalas, and we believe others, but has generally been rejected as superfluous, as an error can scarcely be committed, when it is possible to detect transparency, if the rules already adverted to are observed. Mr. Curling does not mention a circumstance observed by Velpeau and Berard, viz. that transparency may disappear without any assignable external cause, and either remain permanently absent, or return. This probably arises from exhalation of blood from the sac.

The *Spontaneous disappearance* of hydrocele, though very common in infants, is very rare in the adult. Mr. Curling refers to four cases of this event, two of which are recorded by Pott, the others by Sir B. Brodie. One of Pott's cases, however, cannot be considered an example of spontaneous cure. The patient received a violent blow on the scrotum, which became "much swollen and very painful," in a word, highly inflamed, so that the cure was caused by inflammation excited by the injury. One of Sir B. Brodie's cases is almost equally open to objection; in it a hydrocele having become painful *was punctured;* inflammation went on for some time, and the hydrocele finally disappeared. It

might as well be said that those cases, in which the fluid does not collect again after the operation of tapping or acupuncture, are cases of spontaneous cure. We think it worth observing, that though Sir B. Brodie thus adduces but one unexceptionable case of the spontaneous cure of hydrocele in the adult, a very remarkable case no doubt, as the tumour was so large that the patient, a clergyman, was forced to wear his cassock to conceal it, he yet says, "I every now and then see a case in which a spontaneous cure of hydrocele has occurred," (Lond. Med. Gaz. vol. xiii, p. 90.) We thus see how very cautiously we must take general statements made from memory, and without a reference to particular cases, even when such statements emanate from individuals of the greatest talent, candour, and probity.

We shall not dwell on the treatment of hydrocele by external remedies; Dupuytren occasionally succeeded with blisters, but they always failed with Sir A. Cooper. Mr. Curling says, he twice removed hydrocele by means of external remedies, but both cases are inconclusive. In the first, (pp. 145-6,) the hydrocele *was tapped*, and three days after became tender on pressure; leeches, cold lotions, &c. were employed, and the fluid was absorbed in about three weeks; this is an example of the cure of hydrocele by mild inflammation consequent on tapping. In the second case, the application of tincture of iodine caused the temporary absorption of fluid from a very small hydrocele, but the fluid soon collected again, and the cure was subsequently effected by injection.

Mr. Curling gives very minute directions for performing the operation of tapping a hydrocele, on which we shall make but one observation. He says, "the best place for making the puncture is about the centre of the anterior part of the tumour," (p. 148,) and directs us to "insert the trocar, previously well oiled, perpendicularly into the tumour, with a brisk motion of the right hand," (p. 149;) of course adding that the instrument should be directed upwards when it has entered the sac. We prefer Sir A. Cooper's directions, to "introduce the trocar *two thirds* of the length of the swelling downwards, and *not* horizontally, but with a slight obliquity upwards," (op. cit. p. 180;) and we certainly object to the brisk motion of the right hand, especially if the instrument is held perpendicularly, and if the tumour is small; and we must acknowledge, though many will think it wrong and unnecessary, that we approve of dividing the skin with a lancet previous to passing in the trocar. This may appear to some minute criticism, but we appeal to Mr. Curling, who says, with somewhat of exaggeration no doubt, "simple as the case may appear, the surgeon should omit none of the customary precautions, for more mishaps have occurred in the treatment of hydrocele than in any other operation in surgery." (p. 148.)

Incision. This operation, though still performed by some, for example, Rust, Gama, and Jobert, is deservedly rejected by the vast majority of surgeons as a general method of effecting the radical cure of hydrocele. Mr. Curling limits its applicability to cases where "a hydrocele is found to depend on the presence of loose cartilages in the sac," where "it is the only treatment that can be of service." (p. 158.) But injection frequently succeeds notwithstanding the presence of a loose body in the tunica vaginalis, and surely we must admit with Sir A. Cooper, that incision is sometimes indicated "when obscurity hangs over the nature of

the case, as to its being connected with hernia, or some enlargement or disease in the testicle," (p. 158;) and we also think that incision is the best operation in some cases where the cyst is multilocular.

Caustic. This mode of treatment has, we think, been too completely exploded in consequence of not having been properly applied. To use Mr. Curling's words, "a caustic is applied to the scrotum, so as to destroy the integuments and cause a slough, extending to the tunica vaginalis," (p. 160;) and then follow the just and obvious objections: "It occasions a needless destruction of parts, and is liable to produce a tedious and unhealthy sore: its action cannot be regulated with such exactness as to insure an opening through the tunica vaginalis, so that a fresh application of the caustic, or the introduction of a lancet or trocar was often necessary to complete the process; its operation is slow, and the consequences are unnecessarily severe and painful." (p. 161.)

We fully admit the justice of these objections, but some of them may be removed, and others greatly lessened by a more judicious mode of using the remedy. The caustic should not be applied on the skin; a small incision should be made with the lancet nearly down to the tunica vaginalis, and the edges of the incision being protected with oiled lint, the caustic should be rubbed on the bottom of the wound. We have frequently seen this method, by whom proposed we do not know, adopted by others, and have occasionally practised it ourselves with the most satisfactory results. It is greatly superior, in expedition, certainty, and mildness, to the plan above described, which, objectionable as it is, was yet, Sir A. Cooper tells us, "when well managed, a very powerful operation," though true it is, he adds, "it required great attention to its use, was occasionally severe, and some have known it, in a bad constitution, destroy life." (Op. cit. p. 183.) These last observations, however, every one will admit are applicable to injection or any other operation for the cure of hydrocele; nay, Sir A. Cooper saw two patients die from simple puncture of a hydrocele. We by no means intend to imply that the caustic is preferable to injection in the treatment of hydrocele; even when used as we have described, we admit that it is more painful, more tedious, and more severe: we only mean to say that we are greatly inclined to think it the next best method to injection, and to prefer it when injection has been two or even three times used and failed. It is quite inapplicable however to children, in whom, when discutient lotions fail to disperse the fluid, the seton should be preferred, because a single thread suffices in them; but in the adult when injection fails, a large seton is commonly requisite, and we believe the caustic is usually less severe in its effects than such a seton. We are however well aware of the very extensive experience that is requisite to determine the comparative value of different methods of treatment, and by no means pretend that our own has been sufficient to decide the question.

We must pass rapidly over the remainder of Mr. Curling's chapter on the *radical cure of hydrocele*, the entire of which is, in our opinion, very judicious and well calculated to be a safe and satisfactory guide to the practitioner. Mr. Curling generally uses lime water for injecting a hydrocele, which he says, "though a mild injection usually excites sufficient irritation to cure the disease, and I have rarely had occasion to resort to fluids of a more stimulating nature." (p. 168.) We greatly

prefer Mr. Curling's rules for the treatment of the patient after the operation of injection, to those inculcated by Sir A. Cooper. This eminent surgeon told his patient, "If you be in much pain lie down, if you suffer but little take exercise; if you be in much pain, eat very little, and drink only diluents; if you suffer but little, take your dinner, and two or three glasses of wine. Come to me to-morrow." (Op. cit. p. 187.) Mr. Curling's experience, however, does not incline him to rely on the prudence of the patient in regulating his conduct after the operation. "If, as generally happens, symptoms of inflammation arise in the course of a few hours, I usually recommend the use of a suspender to keep the testis supported, and direct the patient to remain in the recumbent position, until the acute symptoms begin to subside. If these precautions be neglected, there is risk of more inflammation being excited than is necessary." (p. 170.) When the inflammation was too low and failed to be sufficiently excited by exercise, handling the scrotum, &c. Sir A. Cooper either tapped the tumour again after a few days, or passed in a seton consisting of a single thread. Mr. Curling does not allude to either of these plans, which, however, often ensure the cure and prevent the necessity of repeating the injection.

M. Baudens has latterly proposed a plan of treating hydrocele, not noticed by Mr. Curling, which we think it well to mention, though we certainly do not anticipate that it will supersede the methods now in use. M. Baudens fits an ordinary acupuncture needle with a canula, which, besides being open at each extremity, is perforated laterally at its centre. This instrument is passed into the hydrocele, brought out about an inch or an inch and a half from the point at which it was passed in, and the needle being withdrawn when the scrotum is thus transfixed, the fluid passes through the central opening into the canula, and thus finds exit. The canula is fixed by twisting a thread round it in a figure of 8, and left in situ for six or eight days. The fluid escapes guttatim, and if obstructed the tube must be cleared. When the fluid passes by the side of the instrument it is withdrawn; the resulting fistula remains open about a week, and when it heals the cure is complete. Such is M. Baudens' account of his method, which of course, like every new proposal, has been most powerful in his hands. Though not strictly connected with the subject immediately under consideration, we may just add, that M. Baudens attaches great importance to this contrivance in the treatment of hydro-sarcocele, as he considers that the smallest quantity of fluid in the tunica vaginalis too small to be removed by any ordinary instrument, materially interferes with the action of medicines on enlarged testicles. (Gazette des Hôpitaux, 1840, p. 531.)

The section on *Congenital hydrocele* is short. As to its diagnosis two circumstances of some importance are omitted; we speak of the disease in the adult. First, that after the fluid has been completely returned into the abdomen, it will usually, though certainly not always, re-accumulate in the scrotum, though the patient remains recumbent. And secondly, that if the patient stands erect when the fluid is in the abdomen, and the finger is kept lightly on the inguinal ring, the tumour will gradually return in the scrotum, though the surgeon has felt nothing pass beneath the finger, and is quite certain that the intestine cannot have descended.

Desault, Dupuytren, and others have injected this form of hydrocele, firm pressure being made on the ring. We have twice seen this operation safely and successfully performed, but we quite agree with Mr. Curling that it should not be practised, on account of the risk of inflammation extending from the tunica vaginalis to the peritoneum. Mr. Curling says, that it actually has excited fatal peritonitis. We were not aware that peritonitis had actually occurred, except when the injection had passed into the abdomen, in consequence of pressure not having been made on the ring. It might be supposed that throwing a wine injection into the abdomen must inevitably excite mortal peritonitis, yet, strange to say, this has not always been the case. Dupuytren (Leçons orales, t. iv, p. 442,) knew of a case in which the patient survived; nay more, in an instance mentioned by Jobert (de Lamballe) (op. cit. t. ii, p. 334,) the symptoms excited were very slight, "Heureusement que le malade en fut quitte pour des coliques, de la sensibilitè au ventre, et quelques symptomes de peritonite."

Encysted hydrocele of the testis. This is an accidental serous cyst, such as is often developed in other situations. It occurs most frequently in the epidydimis, and Mr. Curling refers its origin in this situation to the "small serous cysts not larger than a pea, or even smaller, that frequently exist immediately beneath the tunica vaginalis covering the head of the epidydimis." (pp. 185-6.) These accidental cysts sometimes project the tunica vaginalis before them, and became pedunculated. "These pedunculated cysts never acquire a large size," but "when one or more of these cysts, instead of becoming pedunculated, enlarge so as to form an evident tumour in the scrotum, they constitute . . . . *an encysted hydrocele of the epidydimis.*" (p. 187.)

The second variety of the disease is very rare. In it the accidental cyst is situated between the tunica albuginea, and the tunica vaginalis. Mr. Curling has only met with one specimen of this disease, which he discovered accidentally in the dead subject, and only refers to another mentioned by Sir B. Brodie. Sir A. Cooper, though he does not mention this affection, has figured an example of it, plate xi, fig. 4.

Mr. Curling once found in the dead subject, "six or seven small serous cysts, about the size of currants, studding the surface of the loose portion of the tunica vaginalis . . . . If a cyst thus situated, were to increase to any size, it would constitute a swelling which might be appropriately termed an encysted hydrocele of the tunica vaginalis." (p. 190.)

Encysted hydrocele of the testicle is diagnosticated from simple hydrocele, Mr. Curling says, by the different relative position of the testicle and tumour in the two affections, and also by the different nature of their fluid contents, which, according to our author, are always clear and colourless in the former affection. This is not, however, always the case, for Sir B. Brodie has found the serum yellow, "like that in common hydrocele." (Lond. Med. Gaz., vol. xiii, p. 137.) Sir B. Brodie has never known injection, even though repeated, succeed in effecting the cure of this species of hydrocele. Mr. Curling apparently has, for he merely says that injection does not succeed so well as in common hydrocele. As the symptoms are not unfrequently severe during the treatment of this affection with the seton, the palliative treatment should be preferred,

unless circumstances, such as the bulk of the tumour, pain, &c., render the former proceeding necessary, and Sir B. Brodie mentions a circumstance, not alluded to by Mr. Curling, which is very favorable to the palliative treatment, that is to say, the slowness with which the fluid for the most part collects, as twelve months or even a longer period may elapse before it returns.

Diffused hydrocele of the spermatic cord. Mr. Curling in common with most surgeons does not seem to have met with a case of this affection.

Encysted hydrocele of the spermatic cord. In infants this affection originates perhaps always in imperfect obliteration of the process of peritoneum drawn down during the descent of the testicle, and there can be no doubt that it has frequently a similar origin in adults, though it seems equally certain that it occasionally occupies the deep fascia of the cord or common envelope of the cord and testis, derived from the transversalis fascia. Mr. Curling maintains, that, excepting the case of accidental serous cysts, encysted hydrocele of the cord is always situated in the process of peritoneum just mentioned, and in support of this opinion, cites Cloquet's remark, that the remains of this process are frequently met with in subjects of every age, together with some dissections of his own, of the disease itself. We only differ from this view in thinking it too general, and we may just remark that Mr. Curling, we are sure inadvertently, puts it forward as if he had originated it himself, whereas others, for example, Sir A. Cooper, to whom he might, but does not, refer for confirmation of his ideas, have adopted precisely the same opinion.

With respect to the symptoms of this disease Mr. Curling says, the tumour "feels even and tense, and has a manifest fluctuation." (p. 207.) But it has been generally observed that fluctuation is not a manifest character of this tumour, being on the contrary very obscure and often scarcely or not at all to be detected; the reason of this being that the tumour is usually "tense," as Mr. Curling himself correctly states, or, to use Sir A. Cooper's words, "extremely firm to the feel." (Op. cit. p. 196.)

As to the *Treatment*, Mr. Curling observes that injection "is not much in favour with practical surgeons." Velpeau, however, prefers it, unless several cysts exist, or unless the tumour extends into the inguinal canal; but we quite agree with the author that the seton is the better method of treatment.

A section is devoted to the complications of hydrocele of the tunica vaginalis with encysted hydrocele of the testis, encysted and diffused hydrocele of the spermatic cord, and of hydrocele whether of the tunica vaginalis, or of the spermatic cord with hernia. This section is very well executed, but calls for no particular remark.

Hydrocele of the hernial sac, is a term which has been differently used by different writers. Some, as Scarpa, extend the term to any considerable accumulation of serum in a hernial sac, even when occupied by intèstine. Mr. Curling says, "the term should, I think, be restricted to cases of a chronic collection of fluid in the sac of an old hernia, in which the communication has been permanently obliterated by adhesion at the neck, either of the sides of the sac, or of a portion of omentum or intestine." (pp. 229-30.)

Mr. Curling has, we believe, been rather generally anticipated in this opinion, at least since Boyer insisted on the distinction, that the coexistence of fluid with a hernia was a sheer accident grafted on the chief disease, and that the term in question should be limited to cases in which the sac has been long abandoned by the hernia, its neck become obliterated, and fluid accumulated in its interior, constituting what he calls "hydrocele du sac hernienne sans hernie." Mr. Curling proposes the name *spurious hydrocele of the hernial sac*, for "all cases of a hernial descent coupled with serous effusion," (p. 230;) but we do not see the necessity to designate an accompaniment of hernia, so very common that it constitutes a necessary part of the history of that complaint; and in fact Mr. Curling himself observes, "nothing is more common than the presence of fluid in the sac of a strangulated hernia." (p. 230.)

Respecting the diagnosis of this complaint, Mr. Curling says,

> "I conceive that some little difficulty might be experienced in diagnosing a *small* hydrocele of the hernial sac from an encysted hydrocele of the cord high up, ... a hydrocele of the hernial sac occurs somewhat late in life, is usually of some considerable size, and its fluid contents are of an amber or dark colour, whilst an encysted hydrocele of the cord generally appears before puberty, is rather small in size, and contains fluid which is generally colourless, and nearly free from albumen. Attention therefore to these distinguishing marks, and to the history of the case, would leave but little room for doubt." (p. 227.)

Now we believe, with Boyer, that there is not some little difficulty, but great difficulty, in distinguishing by any external signs hydrocele of the hernial sac from encysted hydrocele of the cord extending to the inguinal ring, in fact that the diagnosis can *only* be effected by a reference to the history of the case: *all* the other "distinguishing marks" above enumerated are illusory. Hydrocele of the cord occurs late in life; hydrocele of the hernial sac may be small in size, and its fluid contents may be colourless.

We pass by the section on *Hydrocele in the female*, and have only to observe respecting the chapter on hæmatocele, that the first section is headed *Hematocele of the testis*, and yet the section commences with the words "in hematocele of the tunica vaginalis:" why then does not the author in the first instance adopt the latter more accurate and generally received term? We mention this the rather, because Richter admitted as a variety of hæmatocele, extravasation of blood beneath the tunica albuginea, and though this has been rejected as a fanciful or at least an unnecessary refinement, or rather because it has been thus rejected, the term should not be applied to another and quite different affection.

The account of the pathology, symptoms, diagnosis, and treatment of the several forms of hematocele is not merely satisfactory, but excellent.

Few diseases occur more frequently than inflammation of the testicle, or *Orchitis*, which forms the subject of Mr. Curling's sixth chapter. We cannot go through this chapter in detail, but will confine ourselves to a few of the more important points of the history of the disease, and take occasion at the same time, for the sake of those who settle every point by an appeal to *authority*, to examine how far the *authorities* are agreed respecting the very nature, mode of origin, and some of the most obvious phenomena of this very common disease.

Mr. Curling observes that he is "unacquainted with any authentic

account of the alteration in structure from inflammation originating in the body of the gland;" (p. 254;) he has, however, "twice been able to inspect a testis affected with acute secondary orchitis;" and from the examinations together with the account of two cases dissected by M. Gaussail, (Archiv. gén. de Méd., t. xxvii, p. 210,) gives the following description of the pathological appearance, which we insert in full, as M. Gaussail's dissections—the only ones, so far as we know, hitherto recorded—having been published in a voluminous foreign journal, are not generally accessible.

"The tunica vaginalis is more or less distended with lymph, or albuminous matter infiltrated with reddish serum, which form loose adhesions between the opposed surfaces of the membranes: these adhesions are so slight as easily to admit of being broken down with the finger. The membrane is injected with a multitude of minute red vessels, which ramify in various directions, and form a compact network. At a later period red vessels may be traced proceeding from the free surface of the tunica vaginalis to the false membranes forming the adhesions. The volume of the testis appears very little if at all increased, the great bulk of the tumour being occasioned by the effusion into the serous sac. When cut into the gland appears somewhat darker than natural, from a congested state of its vessels. The epidydimis, particularly the lower part, is enlarged to twice, and sometimes thrice its natural size, and feels thick, firm, and indurated. This enlargement is produced by the effusion of a brownish deposit in the cellular tissue between the convolutions of the duct. The coats of the vas deferens are thickened, and the vessels ramifying near them injected sometimes along the whole extent of the duct. Albuminous deposit is found in the cellular tissue around the tortuous part of the vas deferens and tail of the epidydimis, which frequently forms the bulk of the swelling observed in these cases. Owing to the epidydimis being the part chiefly and most constantly affected in consecutive orchitis, some of the modern French writers have denominated the disease epididymitis." (pp. 254-5.) Subsequently Mr. Curling adds, "I do not mean to imply, however, that the glandular structure of the testis never suffers in consecutive orchitis, for I believe that it does so in some instances, but according to my observations, and I have paid some attention to the subject, it very commonly escapes, the inflammation not extending further than to the epidydimis." (p. 256.)

The exact nature and situation of the swelling in acute secondary orchitis has within these few years given rise to a great deal of controversy. It was always known that much of the tumefaction was formed not only by the swollen epidydimis, but by effusion into the cavity of the tunica vaginalis; but it was also taken for granted that a considerable, perhaps the greater, part of the tumour consisted of the body of the testis. Thus Sir A. Cooper says, "the testicle swells and soon increases to two or three times its natural bulk," (op. cit. p. 9,) and "although the testicle is *very much swollen*, it still retains its original form, being rounded on its fore part, but somewhat flatter on its sides, and it feels excessively hard," (p. 10,) and the peculiar kind of pain experienced in this affection was generally accounted for by the compression exerted by the tunica albuginea on the swollen glandular structure of the testicle. This doctrine we believe was never questioned until Rochoux in 1833, (Achiv. gén. de Méd., t. xxxii, p. 51,) maintained that the body of the testicle was not affected in gonorrheal orchitis, that the disease consisted in inflammation of the tunica vaginalis, and should therefore be called *vaginalitis*, and that effusion into this serous sac formed the great bulk of the swelling to which the epidydimis contributed in but a trifling de-

gree. M. Marc Moreau, (Journ. Hebdom. 1834, t. ii, p. 218,) also contended that the body of the gland is unaffected except in rare cases, but considered the affection as an acute inflammation of the vas deferens and epidydimis which implicated the tunica vaginalis; and this is the view adopted by Ricord, who proposes to term the malady *epidydimitis*. Others, however, still adhere to the old opinion: for example, Velpeau has satisfied himself, from the examination of above 100 cases, that the inflammation extends to the body of the testicle as well as to the tunica vaginalis, and that though the effusion into the tunica vaginalis forms from a third to one half the bulk of the swelling, in about half the cases it is frequently very slight, and occasionally quite absent. (Dict. de Méd., 2e ed., t. xv, p. 445.)

Mr. Curling takes no notice of this discussion, but, as we have seen, adopts the opinion of M. Marc Moreau. For our own part we too have paid some attention to this subject, and are persuaded that the body of the testicle participates in the inflammation when the disease is fully developed. This question we think is susceptible of being determined by examination of the disease during life, but if dissections must be appealed to, they also establish that the glandular structure of the testicle is affected. The dissections of the disease in its early stage are too few to admit of any general conclusion being grounded on them, and they are contradicted by the numerous examinations that have been made of those organs at a remote period after the subsidence of the inflammation. If this were merely a question of the opinions entertained by different individuals it would be little worth dwelling on, but we conceive that it is otherwise important; for if the body of the testicle so rarely participates in the disease, its structure can be very rarely affected by it; but we believe that the direct contrary is the case.

When speaking of inflammation of the tunica vaginalis, we showed that Sir A. Cooper generally found marks of inflammation of that membrane, such as adhesion, to coexist with an alteration in the structure of the gland. Let us now see what Mr. Curling says respecting the condition of the organ after it has been inflamed:

> "In many instances, after acute orchitis has subsided, the testis is restored to its natural condition; in other cases, permanent changes of a serious nature are the consequence. I have observed in testes that have been affected with inflammation some time before, that the septa appear to be more distinct, and to enter more largely into the composition of the gland than is natural; that the small seminal tubes are less numerous and apparent; and that a great part of the organ is converted into a dense white fibrous tissue without the presence of tubuli." (p. 258.)

This passage, which, by a coincidence no doubt fortuitous, is nearly identical with one which we formerly quoted from Sir A. Cooper, is followed by an account of the appearances observed by Sir B. Brodie, in a testicle which had been affected twenty years previously with gonorrheal orchitis, appearances identical in kind, though greater in degree, with those described by Sir A. Cooper and Mr. Curling. But our author goes on to advert to differences between the remote effects of gonorrheal orchitis, and that which originates in the body of the gland.

> "Consecutive orchitis" he says, "*seldom* subsides without leaving behind distinct traces of its existence, which never disappear during the remainder of the patient's

life." [These traces are chiefly enlargement of the epidydimis with thickening and dilatation of its duct.] "These changes are *rarely found* without the presence of *old adhesions* obliterating partially or completely the sac of the tunica vaginalis. . . . . The alterations noticed in the body of the testis have been observed, in some instances, coexisting with those in the epidydimis, but in by far the majority of cases, the glandular structure is unimpaired. In only two cases in which the epidydimis was thus diseased, have I remarked *a decidedly atrophied condition* of the organ. The absence of pressure, owing to the unresisting nature of the membrane investing the epidydimis, appears to prevent the obliteration of the duct of which it is composed, and thus accounts for atrophy occurring much more rarely after consecutive orchitis than after inflammation originating in the body of the gland, where the delicate seminal tubes are inclosed in a firm unyielding tunica albuginea." (pp. 259-60.)

On this passage we have to remark that undoubtedly *atrophy* of the testis very rarely follows gonorrheal inflammation of that gland, but we may observe that very serious alterations of its structure are often caused by inflammation consecutive on other diseases of the urethra, simply because those other diseases being chronic or permanent, the organ is liable to repeated attacks of inflammation, each of which inflicts a cumulative alteration on its structure. To return, however, to the consequences of gonorrheal inflammation of the testicle: no one pretends that it produces "a decidedly atrophied condition of that organ," save in very exceptional cases; but the question is, does it usually, or very often, alter the structure of the body of the gland in a minor but yet perceptible degree? And this question cannot be disposed of by the general statement that "in the majority of cases, the glandular structure is unimpaired," especially when Mr. Curling's own statements combined with those of Sir A. Cooper, go to establish the opposite conclusion. Mr. Curling distinctly states that gonorrheal orchitis *seldom subsides* without leaving certain changes in the epidydimis, which changes are *rarely found* without *adhesions* of the tunica vaginalis; but we have the testimony of Sir A. Cooper, that such adhesions are generally accompanied with diminution of the size of the testicle, and alterations of its substance. It will readily be admitted that such appearances are the remote effects of inflammation, and we are therefore justified in concluding that the body of the testicle participates in gonorrheal orchitis, at all events much more frequently than our author with several modern writers admit. It is right to observe that we attach more importance to Sir A. Cooper's evidence on this point, simply because it is positive or affirmative, while that of Mr. Curling is negative; and negative evidence is worth nothing unless founded on minute and carefully-described examinations, and above all unless we know, if not the exact number, at least something near the number of observations on which it is founded.

The origin of gonorrheal orchitis has been referred to metastasis, sympathy, and continuous extension of the inflammation from the urethra to the testicle. This is a point on which we shall find the authorities sadly at variance, and it will be worth while to state a few of the discordant opinions of men of the most deserved eminence and greatest practical reputation.

Dupuytren admits the three modes of origin above enumerated: that by metastasis he considers the most frequent, and says the sudden cessation of the discharge from the urethra, is its pathognomic sign. In

the sympathetic variety the discharge, he says, is little if at all modified, the inflammation usually affects the tunica vaginalis, and the scrotum is greatly swollen. Propagation of the inflammation by continuity of surface occurs, he says, but rarely, and is characterized by an inflammation of the testicle, "in which the tumour, very hard, very painful, moveable and always small, presents a prominence formed by the swollen epidydimis. This last phenomenon seems to us a character peculiar to gonorrheal orchitis produced by continuity of tissue, for we have *never* met with it in those caused by external violence, or in cases where the inflammation was suddenly transported from the urethra to the testicle." (Leçons Orales, t. iv, p. 221.) Sir B. Brodie and Ricord admit only the first and third forms of the disease; Ricord says nothing as to their comparative frequency, but Sir B. Brodie considers the metastatic variety the usual one, and that by extension of inflammation as very rare, (Lond. Med. Gaz., vol. xiii, p. 218.) Cullerier, writing in 1830, says, the theory of metastasis is abandoned, and that the inflammation is always propagated by continuity of tissue; (Dict. de Méd. et Chirurg. Prat., t. iv, p. 157;) but in 1834, he informs us that metastasis occurs in nine cases out of ten. (Dict. de Med. ou Repért. gén. etc., 2e ed., t. xii, p. 267.) Sir A. Cooper says indeed that the disease "arises from sympathy with the urethra," but distinctly describes it as solely caused by continuous extension of the inflammation, and Velpeau also, not to mention others, ascribes it to this last cause exclusively. We may just add that Dupuytren, Sir A. Cooper, and Sir B. Brodie, say the discharge from the urethra either usually or frequently ceases, as the inflammation of the testicle supervenes, while Cullerier and Ricord maintain that it never entirely disappears.

Mr. Curling differs from all the authors whose opinions we have cited, that is to say, so far as he gives a decided opinion, for he recognizes only the second and third forms of the affection, or that caused by sympathy, and that depending on continuous propagation of the inflammation. As to metastasis he says, "it is extremely questionable whether anything of the kind ever takes place." (p. 264.) The most frequent cases are those "in which inflammatory action may be gradually traced creeping along the vas deferens to the epidydimis." (p. 264.) "The sympathetic form of gonorrheal orchitis," is that "in which the testis is attacked, apparently without any previous affection of the vas deferens." (p. 267.) These last, Mr. Curling says, are the cases that have been attributed to metastasis, a doctrine "which we cannot readily admit," when we consider how readily and rapidly inflammation may be propagated along a continuous membranous surface without remaining fixed at any part of it long enough to produce any signs of disease, how rarely the symptoms of gonorrhea entirely subside as the orchitis becomes developed, and how seldom the sudden arrest of the discharge by medicine or by injections, is followed by orchitis; and finally Mr. Curling argues that the marked amelioration of the symptoms of gonorrhea that so often occurs cannot be considered as a proof of metastasis, as inflammation of one part is often relieved by the occurrence of inflammation in a neighbouring part, and he once saw a case in which orchitis caused by a *blow* on the testicle was followed by the subsidence of gonorrhea, with which the patient happened to be affected.

The length to which this article has already extended precludes us from discussing Mr. Curling's arguments, and we can only say that we consider the occurrence of metastatic gonorrheal orchitis as firmly established as any example of metastasis of inflammation can be. Its existence no doubt can only be inferred from the observation of symptoms, but the facts expressed by those symptoms cannot be explained away by a reference to circumstances, ***not one of which is strictly analogous*** to the fact with which it is compared and is intended to illustrate.

We have mentioned the different opinions of eminent practitioners as to the connexion between, or the symptoms of orchitis and those of gonorrhea. On this point Mr. Curling gives an abstract of the researches of M. Gaussail, (Archiv. gén. de Méd., t. xxvii, p. 188,) M. d'Espine, (Mém. de la Soc. Méd. d'Emulation, t. i, p. 426,) and M. Aubry, (Archiv. gén. de Méd. 1841, Mai, p. 23,) from which it appears that in 125 of 154 cases observed by MM. Gaussail and Aubry, the discharge diminished at the commencement of the attack, and 1 in 6 out of 29 cases observed by M. d'Espine, the discharge underwent no change, in 22 was either increased, diminished, or suppressed, and in 3 cases only did it after having been suppressed at the commencement of the affection, reappear as the acute symptoms of orchitis subsided.

There are some remarkable phenomena of this disease which Mr. Curling notices: how rarely for example both testicles are simultaneously affected, and its liability to pass from one testicle to the other. It has been almost generally believed that the left testicle is most frequently affected, but the observations of MM. Gaussail and Aubry, and of Mr. Curling himself, would lead to the opposite conclusion, as in 138 cases they found the right testicle affected in 78, the left in 49, and both in 11, but in most of the last cases, the inflammation had passed from one gland to the other.

Mr. Curling "does not recollect having met in medical works with any notice of acute inflammation attacking the testes of young infants. I have seen, however, a few cases of orchitis at this early period." (p. 272.) An account is given of two cases, one in an infant aged five months, the other in a boy two years old. They both soon yielded to suitable antiphlogistic treatment.

The directions for the treatment are exceedingly judicious; but there is one point that we must notice. Mr. Curling says the value of mercury in the treatment of consecutive orchitis, "scarcely appears to be fully appreciated by the profession." (p. 280.) We cannot agree in this, for certainly our observation would have led us to say it is often given in cases when it could be dispensed with. We utterly disagree with Mr. Curling "that mercury is indicated because of the inflammation of the tunica vaginalis, as reason would lead us to expect from its remarkable efficacy in inflammation of other serous membranes." (p. 280.) If this were all it would be quite unjustifiable to salivate the patient. We agree, however, with the author that in acute cases, mercury given until the gums are slightly affected, often materially abridges the duration of the disease, and "what is of some importance"—we would say of great importance—"is succeeded by much less induration and thickening of the epidydimis." (p. 280.) To this we would add, as by far the most important point, that the use of mercury tends to prevent the alterations of the body of the gland to which, we think we have shown, it is liable.

At the close of this chapter Mr. Curling notices Mr. Ramsden's views as to the connexion between disease of the urethra and chronic disease of the testicle. That Mr. Ramsden's views were monstrously exaggerated is universally admitted, and the exaggeration has perhaps caused them to be too completely neglected; Mr. Curling we think appreciates them very fairly, but as they exclusively related to chronic disease of the testicle dependent on what Mr. Ramsden terms "a latent principle of irritation within the urethra," they would, we think, have been more appropriately noticed in the next chapter on chronic orchitis.

The disease termed "chronic orchitis" by Mr. Curling, is that called "chronic inflammation" and "simple chronic disease of the testicle" by Sir A. Cooper. Sir B. Brodie names it "chronic or *tubercular* inflammation of the testicle, because it ends in the formation of a yellow tubercle in the testicle," (op. cit., p. 220;) and Cruveilhier terms it "tubercular sarcocele," and "tubercular infiltration of the epidydimis."

Mr. Curling objects to the yellow deposit which characterizes this disease being termed tubercle, "as it differs from tubercular deposit, which is also developed in the testis, and is liable to lead to error." (p. 295.) Sir A. Cooper describes this deposit as "yellow fibrin, or coagulable lymph," and Mr. Curling says "it appears to be coagulable lymph" condensed by the tunica albuginea resisting distention. There can, we think, be no doubt that the name chronic inflammation or chronic orchitis should be preferred for this disease, and the term "tubercular" confined to scrofulous diseases of the organ.

Sir A. Cooper and Cruveilhier state that the peculiar yellow deposit seen in this affection occupies the cellular membrane between the tubuli seminiferi. Sir B. Brodie is of opinion that it is secreted from the inner surface of the tubuli testis, as he discovered the yellow substance in the vas deferens and canal of the epidydimis, which are continuous with the tubuli. Mr. Curling gives a minute account of the examination of a testicle, (pp. 291-4,) in what seemed to be an early stage of the affection, which he thinks enables him to confirm satisfactorily Sir B. Brodie's opinion.

Mr. Curling proposes for the fungous growth, or granular swelling which sometimes protrudes in the advanced stage of this affection, the name of "*hernia testis*, being formed in a manner very analogous to that of *hernia cerebri*, in which the substances of the brain is protruded through an ulcerated opening in the dura mater." (p. 296.) Both the suggestion and illustration are borrowed, but without acknowledgment, from Sir A. Cooper, who says, "the principle upon which it (the granular swelling) is founded, is the same as the granular swelling of the brain succeeding a wound of that organ, compressed, when swollen, by the bones of the skull and by the dura mater," (op. cit. p. 36,) and he calls it a "hernial granulatory protrusion." (p. 38.) Nevertheless we think the name improper, or at least unnecessary.

The account of the symptoms, diagnosis, and treatment of this disease is excellent. We have only to observe that though Mr. Curling questions the propriety of the practice recommended by Mr. Lawrence, and occasionally adopted by Sir A. Cooper, of slicing off the *granular swelling or fungus* of the testis, he scarcely does so as decidedly as we could wish. Sir A. Cooper says the granular swelling "is formed of common granu-

lations only," (op. cit. p. 36,) and we therefore can understand why he was induced to make "an elliptical incision in the skin around the projecting granulations," and then carry the knife "under the whole of the swelling, and close to the tunica albuginea, by which the part is excised, leaving the epidydimis and *testicle uninjured.*" (Op. cit. p. 45.) With respect to this practice Mr. Curling says, "I must confess that the operation of excising it scarcely seems to me to be a very scientific mode of proceeding, seeing that the fungus partly consists of tubuli seminiferi, and in some instances includes nearly the whole of the glandular part of the testis, so that its removal becomes an operation which in effect is but little less than that of castration." (p. 317.) Now this is a case for decidedly stating a positive rule of practice, that the fungus is by no means to be interfered with, and Sir A. Cooper should be cited not hesitatingly to question his authority, but to prevent his authority leading the practitioner astray, by stating that in this particular he was unquestionably wrong, because he thought the fungus consisted "of common granulations only." We may just add that Sir B. Brodie, without any reserve, says "the fungus should not be removed, as by doing so we slice away the tubuli testis." (Loc. cit. p. 222.)

The pathological characters and symptoms of "syphilitic orchitis" are far from being satisfactorily determined.

Mr. Curling has had no opportunity of dissecting a venereal testicle, but he refers to Sir B. Brodie, who examined one and found the morbid appearances to correspond with those observed in chronic inflammation. Cruveilhier, we may observe, also says that exactly the same morbid alterations occur in the testicle in syphilis, chronic inflammations after contusions, etc. Mr. Cusack has published the results of the dissection of about twelve syphilitic testicles, which, though very far from being detailed with sufficient precision and clearness, we subjoin, and which to a certain extent confirm the observations of Sir B. Brodie and Cruveilhier. The testicles examined exemplified, we are told, the progress of the disease "from a small circumscribed tubercle in an otherwise sound testis, to the contracted, indurated, and completely disorganized gland. The structure of the tubercle is rather soft, but harder than common scrofulous tubercle, and surrounded by a thickened layer resembling a cyst, the product of inflammatory action. In one preparation the tubercle is in the lower part of the testis, which is otherwise so sound that the epidydimis admitted of injection by mercury." (Dublin Journ. of Med. Science, vol. viii, p. 304.)

A great number of writers have attempted to give a description of the local character of the venereal testicle, but so far as we can recollect they almost all conclude by saying that a diagnosis can only be effected by the co-existence of other venereal symptoms, or by reference to the history of the disease. Dupuytren says the tumour is elongated, cylindrical, and painless when handled, but that its *pathognomic* character is the swelling leaving one testicle after affecting it for perhaps months, and suddenly attacking the opposite one. (Leçons Orales, t. i, p. 108.) Ricord says the tumour is hard, pear-shaped, sometimes uneven and relatively heavy, that the epidydimis or cord may be implicated, but that the body of the gland is always affected. Without further specifying individual opinions, it is enough to say that many, we believe most, writers describe the swelling as commencing in the body of the testicle, and

gradually involving it and the epidydimis in one common tumour so that these two parts cannot be distinguished; this tumour is said to be smooth and uniform on the surface, of a fleshy or firm feel, but not extremely hard, not very weighty in proportion to its bulk, and very little prone to suppuration; but the symptoms are admitted to be so variable, that the diagnosis, as already said, can only be established by the coexistence or antecedence of venereal symptoms.

Mr. Curling does not attempt any particular description of the local characters of this disease of the testicle, which he says "only differs from those of chronic inflammation of the gland, in the testis becoming occasionally more tumid and painful during the evening exacerbations, or in the occurrence in some cases of nocturnal lumbar pains." (pp. 230-1.) We freely admit that Mr. Curling may be right in not attaching any importance to the local symptoms above enumerated; yet as we know from personal observation that they do occur, we are inclined to think that it would have been better to have mentioned them. The commencement of the affection in the body of the gland, and its termination in suppuration are, we should mention, specified. Mr. Curling says "the enlargement takes place slowly:" undoubtedly it usually does, but not unfrequently the affection comes on rather suddenly.

"Tubercular disease," properly so called, more frequently affects the epidydimis than the body of the gland. The precise anatomical situation of the morbid deposition is not exactly determined. Mr. Curling has examined many testicles affected with strumous disease, and has "certainly seen this (the tubercular) deposit in the vas deferens near the testis, and in the interior ducts forming the epidydimis." (p. 325.) He, however, thinks that tubercular matter is "deposited within as well as between the tubuli." (p. 326.)

Mr. Curling's account of the symptoms of scrofulous disease of the testis is in our judgment the very best we have met with; superior, we think in minute accuracy and fidelity to that of Sir B. Brodie (loc. cit.) which is the next best we are acquainted with. On this account, and also because we have not yet given any connected examples of Mr. Curling's manner of describing disease, we insert the following quotation:

"The disease commences insidiously, and is insidious in its progress. The patient's attention is usually first attracted by a slight uneasiness in some part of the gland, generally the epidydimis, which on examination is found to be somewhat enlarged, prominent, and hardened. Sometimes the whole organ feels slightly enlarged and indurated, though it more frequently forms a tumour with an unequal and irregular surface. The state of the testis, however, is often marked by small local effusions of fluid in the tunica vaginalis, the surfaces of this membrane being partially adherent. Very little pain is experienced in the part, and there is but slight tenderness on pressure. After the disease has lasted for some time, many months or even a year and more, making little progress, and often remaining stationary, one of the prominences begins to increase so as to be observed externally, and to feel painful and tender; the skin over it becomes adherent, changes to a livid hue, ulcerates and bursts, giving vent to a soft caseous matter mixed with pus. This is followed by the formation of a fistulous sinus, which discharges a scanty thin serous pus, mixed with particles of tubular matter and often with semen, particularly after venereal excitement. Similar changes may take place in other parts of the testis, occasioning two or more sinuses leading to the interior of the gland. These sinuses sometimes communicate, and they may continue open and discharging for a great length of time. After the deposit has all come away, if the original

disease be arrested, and no more tubercular matter formed, reparative changes sometimes take place; the discharge ceases, the fistulæ close up, leaving the organ more or less diminished in size or entirely wasted, according to the extent to which it had been disorganized by the tubercular deposit. The bursting of the abscess and escape of the tubercular matter are sometimes followed by a hernial protrusion of the testis, as after chronic inflammation of the gland." (pp. 328-9.)

The directions for the treatment are judicious and practical. Mr. Curling says nothing of the use of the liquor potassæ which Sir B. Brodie has found more useful than anything. We mention this the rather that we have derived singular benefit from the use of medicine not only in this affection, but generally in cases of external tubercular disease; but it must be given in large doses, gradually augmented to sixty or eighty drops three times a day if possible. We feel satisfied (though well aware how difficult it is to fairly estimate the therapeutic influence of remedies in chronic diseases) that this medicine, given as freely as the case will allow, in combination with the iodide of potassium, effects greatly more than the latter medicine will accomplish by itself.

Mr. Curling has never seen a case of scirrhus of the testis, and merely gives an abstract of Sir A. Cooper's account of this disease, and we therefore pass by this chapter. The section on *Encephaloid cancer of the testis* is about the best account of the disease which we have met with, and is followed by a short account of that rare affection, "carcinoma of the tunica vaginalis." The still rarer diseases *Colloid cancer and melanosis of the testis* are despatched in a few lines; but we do not know that more could have been properly said about them. With respect to the disease described by Sir A. Cooper, under the name of *Hydatid or encysted disease of the testicle*, Mr. Curling observes that the phrase *hydatid* is here improperly employed, and prefers the term *Cystic sarcoma or cystic disease of the testis*. As his account of the affection is but an abstract of Sir A. Cooper's, we need not dwell on it. We also pass the very brief and unimportant (yet necessary) sections on *Fibrous transformation of the testis*, *Ossific deposits in the testis*, *Loose bodies in the tunica vaginalis*, *Spermatocele*, *Fœtal remains in the testis*, and *Entozoa in the testis*.

Mr. Curling considers the nervous affections of the testis under the heads *Irritable testis* and *neuralgia of the testis*, both of which Sir A. Cooper evidently comprised under the former appellation. The account of the symptoms of irritable testicle closely corresponds with that given by Sir A. Cooper; in it "there is merely morbid sensibility; pain seldom being experienced whilst the patient remains at rest, and the gland and spermatic cord are supported and entirely free from pressure or rough contact with the dress," (p. 380;) but in neuralgia "the pain is sudden, severe, and remittent, and occurs in paroxysms of variable duration, generally at irregular but occasionally at regular intervals. The pain is sometimes of an acute, darting, or lancinating description, at other times of a dragging or pricking nature, and it is commonly attended with forcible retraction of the testis to the groin by the spasmodic action of the cremaster muscle, and occasionally with nausea and vomiting," (pp. 380-1.) Sometimes the testicle can be freely handled, but morbid sensibility may coexist, and then the slightest touch may bring on a paroxysm. Usually no alteration is perceptible in the gland, but in an aggravated or old case

it may become swollen, tender, or even slightly inflamed. Neuralgia is almost always confined to one side; morbid sensibility often implicates both. Sir A. Cooper considered irritable testis generally as "of the nature of tic douloureux," (Op. cit. p. 64.) Mr. Curling refers the "neuralgia" alone to this head, and says the "irritable testis is in general intimately connected with the state of the genital functions, and is frequently dependent on abuses of them," (p. 376.) As causes, he mentions onanism, involuntary seminal emissions, cessation from free indulgence in sexual intercourse, sexual excitement without indulgence, and occasionally orchitis. "Though troublesome, it generally disappears either spontaneously or under treatment after a longer or shorter duration," (p. 377.) In the treatment Mr. Curling recommends tonics, cold bathing, the douche, belladonna-plaster, and, when there is morbid sensibility of the prostatic portion of the urethra, the application of caustic to that part of the canal by means of Lallemand's porte-caustic, by which he cured three cases. He properly deprecates castration in any case of this disease. Little is known of the causes of *neuralgia* of the testicle. Mr. Curling mentions as occasional causes, varicocele, derangement, of the digestive organs, gout, and orchitis. As to the treatment, it must be directed to the cause where it can be detected, and if it cannot, must be empirical. Quinine, arsenic, iron, oil of turpentine, and narcotics, both internally and locally, may succeed—but more frequently fail. In aggravated and obstinate cases castration has frequently been performed, but Mr. Curling remarks, "Operations, however, for the cure of neuralgia are in general very precarious and unsatisfactory, and the more extended our experience, the less encouragement we find to repeat them. ...... We find that in several of the cases in which the operation has been resorted to, no benefit has resulted from it." (p. 385.) The results of the three cases operated on by Sir A. Cooper were, however, satisfactory. Mr. Curling examines these three cases "in order that the practice of so eminent a surgeon may not be made to countenance the indiscriminate performance of an operation, the general results of which are less satisfactory than might be inferred from these examples." (p. 389.) In all of them Mr. Curling thinks the operation succeeded because the disease was of local origin, varicocele having been present in one, and in the two others the affection having apparently been induced by orchitis. We would account for the success of the operation in the second and third of Sir A. Cooper's cases, from the fact that these cases were examples not of neuralgia, but of irritable testis.

In a chapter on *Sympathetic and functional disorders of the testis*, the subjects of *Impotency* and *Involuntary seminal emissions* are treated of. We deem it unnecessary to give an analysis of the observations on the former affections, but we venture to say that they contain everything that is known respecting it, and will prove very valuable and satisfactory to the practitioner who may need a reference on the subject. The latter has been so amply discussed in the Number of this Journal for April 1843, that it is wholly unnecessary to recur to it. We must find room, however, for the following observations on the occasional connexion between a morbid condition of the prostatic portion of the urethra, and certain debaucheries too often attributed to moral depravity exclusively:

"One would be loth to offer any apology for the vicious habits and indulgences

to which it is well known old men are occasionally addicted. .... I cannot but think, however, that in many instances these cases are not undeserving of professional sympathy, and that the erotic longings, which sometimes continue to distress the aged long after the period at which in the course of nature they should have ceased, depend as much on physical infirmity as mental depravity, the former inciting and producing the morbid desires. If these propensities were regarded and treated as symptoms of disease, (and that they frequently occur in connexion with affections of the urinary passages is well known to practical surgeons,) I believe they would often subside, and the distressing results to which they lead would be altogether avoided. (pp. 414-5, Note.)

The chapter on *Castration* requires no comment. We shall make a few observations on that on *Varicocele*.

Within the last few years many surgeons have exerted their ingenuity in devising methods, more or less novel, for the treatment of varicocele; and we think that it will no doubt continue very fashionable to operate on this disease until a few fatal cases of phlebitis gain publicity, and then interference will be deprecated—to be renewed, however, again after the lapse of a suitable period. Mr. Curling, we must observe, is not at all chargeable with encouraging unnecessary meddling with this affection; on the contrary, he expressly limits operation to "the few instances in which palliative means fail to afford relief and arrest the decay of the testis, and the pain and annoyance are really so great as to require something to be done to alleviate the patient's suffering;" (p. 474;) and these cases are certainly not of frequent occurrence. We may on this head notice an inconsistency in Sir A. Cooper's statements. In his large work on the testicle he says, "Varicocele should scarcely receive the title of a disease," but "in a *few* examples it produces uneasiness in the loins," (p. 219,) and "it does in a very rare case happen that persons suffer great pain in the testis and loins from a varicocele." (p. 223.) In the third vol. of Guy's Hospital Reports, however, he tells us "I have seen, in the course of my practice, *many persons* suffer so severely in body and in mind from this complaint, that they would readily submit to any operation which was not attended with danger to life to obtain relief." (p.7.)

Sir A. Cooper says that tying the spermatic vein is an operation which "he would dread most exceedingly," and he proposed the removal of a portion of the scrotum as a means of support, and diminishing the volume of the enlarged veins: this operation he had never performed at the time he proposed it, but he subsequently published in the work last quoted from, five cases of cure or relief effected by its means. With respect to this operation Mr. Curling informs us that he examined a man on whom Sir A. Cooper himself performed it, "but who derived so little benefit from the operation that he afterwards submitted to castration; and a medical friend lately informed me that in one of the published cases of success the disease subsequently returned as bad as ever." (p. 458.) And a good deal of inquiry has led Mr. Curling to conclude "that excision of a portion of the scrotum is calculated to arrest the progress of varicocele, and afford full and permanent relief, only in those cases in which the painful symptoms of the disease admit of being temporarily but completely removed by suspending the parts in the hand, or in a well-adjusted suspensory bandage." (p. 460.)

We need not follow Mr. Curling through his full and clear description of the various methods proposed for the radical cure of varicocele, by division of the vessels, by ligature, whether in the old way, or variously

modified in its application by Davat, Ricord, &c., by compression, or by excision of the vessels. We shall merely notice two of the numerous plans described.

The first of these methods is one attributed to Mr. Luke. A ligature is carried through the root of the scrotum between the varicose mass of veins and the vas deferens, and the ends attached to an instrument termed a fistula tourniquet, by which the ligature can be tightened or loosened at pleasure. The ligature is drawn moderately tight at first, and as it becomes relaxed by cutting through the included parts, the pressure is kept up by turning the screw until the patient complains of pain. Mr. Curling, if driven to an operation, would prefer this plan, an important advantage of which, he thinks, "is the effect of the gentle pressure first produced in exciting sufficient irritation to cause obliteration of the veins before the constriction afterwards made by tightening the ligature cuts the vessel through." (p. 476.) Now this plan only belongs to Mr. Luke so far as the use of the screw tourniquet is concerned, for otherwise it is absolutely identical with that of M. Reynaud (de Toulon), the whole difference being that the French surgeon instead of employing a screw, tied his ligature with a slip-knot on a roll of diachylon plaster or a pledget of lint, and thus was enabled to regulate the amount of pressure. The screw tourniquet may, for aught we know, be a more commodious method of managing the ligature, but it, at the utmost, constitutes an improvement in the mechanical details of M. Reynaud's operation and should only have been mentioned as such, whereas M. Reynaud's name is not alluded to at all. The second method we have to notice originated thus:

"A surgeon suffering from a varix in the leg, having heard Sir C. Bell state in illustration of the fact of the dilatation of a varicose vein being caused solely by the pressure of the column of blood, that if the distended vein be compressed with the finger the swollen condition of the vessel beneath shortly disappears, was led to apply the principle thus indicated to the treatment of his own case, which was attended with a satisfactory result. This gentleman mentioned the circumstance to Mr. Aston Key, who was accordingly induced to adopt the same principle in the treatment of cases of varicocele, and in a private communication with which I have been kindly favoured by Mr. Key, he has assured me that he believes the practice resorted to is effective, and applicable to the majority of cases of varicocele." (p. 469.)

Mr. Curling goes on to observe that if in a case of varicocele pretty firm pressure be made on the spermatic cord, the veins, if previously emptied while the patient was lying down, will not fill again, or if distended will gradually be emptied in consequence of being relieved of the superincumbent column of blood. This, he remarks, is not incompatible with the well-known method of distinguishing a variocele from a hernia, as gentle pressure, for an obvious reason, will cause the veins to swell below. Mr. Curling has not noticed, what is worthy of remark, that Sir A. Cooper observed this very phenomenon, but gave it a wrong interpretation, for he says, in speaking of the diagnosis of this affection from hernia, (Guy's Hospital Reports, vol. iii, p. 5,) "but the pressure must not be sufficient to arrest the blood in the spermatic artery, or the veins will remain empty;" and looking to the mobility of the spermatic artery and the nature of the tissues by which it is surrounded in a case of varicocele, such as could even remotely simulate hernia, it will, we suppose, be readily admitted that the empty state of the veins observed by Sir A. Cooper, when

too great pressure was exerted, arose, not from the artery being commanded, but, from the dilated veins being thoroughly compressed. These considerations have led to the proposal of treating varicocele by the application of a truss to the external abdominal ring, a proceeding which, it has hitherto been supposed, to use the words of Sir A. Cooper, "not only cannot benefit, but on the contrary, must necessarily have a pernicious influence, by preventing the free return of blood from the testis," (on the Testis, pt. ii, p. 221;) but the whole principle of the proposed method depends on the *degree of pressure* exerted by the truss.

"The object then of this method of treatment may be stated to be the maintenance, whilst the patient is in the upright position, of such a degree of pressure on the spermatic veins as may be sufficient to relieve them from the superincumbent weight of the blood, without at the same time endangering the integrity of the testis by obstructing the spermatic artery, and without causing so much uneasiness as to render the remedy as painful as, or more difficult to be borne than the disease. This pressure must be continued a sufficient time to enable the coats of the vessels to return to their natural dimensions, and to acquire strength to carry on the circulation. When this is effected the patient is cured." (pp. 470-1.)

The principle on which this plan of treatment is founded is unexceptionable, but it can hardly be called new; it has long been applied to the treatment of varix of the lower extremity, and has frequently succeeded, though it too often fails solely on account of the practical difficulty of carrying it into effect. The use of the thigh-truss in varix of the saphena vein is strictly analogous to the proposed treatment for varicocele. Mr. Curling is therefore quite right in saying "that the main difficulty of this treatment consists in the application of continuous local pressure." (p. 471.) He has heard of two cases in which the compressing instrument could not be borne, but in a third, Evans's patent truss effected a cure without producing the slightest inconvenience. If the mechanical difficulty can be surmounted, we certainly are inclined to anticipate that this mode of treatment will often be found effectual.*

The Fourth and last Part is devoted to the diseases of the scrotum. We regret that our exhausted space forbids our giving any account of these. We must, however, direct the reader's attention to the excellent account given of the *chimney-sweeper's cancer*, in chap. x, which contains several new and interesting particulars well worthy of notice. As the last part occupies little more than fifty pages, it will be seen that we have submitted to our readers a tolerably complete view of the work. The great length to which this article has extended indicates the very favorable opinion we have formed of Mr. Curling's book; for we certainly would not have allowed so much space to an inferior production. The author has not only been happy in the selection of his subject, as a work embracing within a moderate compass all the diseases of the testis and of the scrotum was very

* We learn from Mr. Curling, that since the publication of his work on the testis, he has treated three cases of painful varicocele by compression of the vessels applied with the lever-truss. In all three, very decided relief was afforded by this plan, and the patients were able, after a short time, to tolerate the necessary pressure without inconvenience. One, a copper-smith, has since been able to follow his laborious occupation, which he had been compelled to forego; and another, a medical assistant, to continue his duties in a standing posture for many hours of the day, without suffering from the disease. Equal benefit has resulted in a fourth case treated in this manner, by a medical friend of Mr. Curling's.

much wanting, but he has executed his undertaking with praiseworthy industry and zeal, aided by a sound practical judgment. The materials for the history of these diseases lay scattered in numerous journals, systematic works and detached treatises; Mr. Curling has collected and arranged them, so that they are now accessible in a single volume, and this he has done not as a mere compiler, but in a way that proves him to possess a thorough practical acquaintance with the matters in hand. We cannot in justice say that the author has thrown much new light on the nature and treatment of the disorders of the testicle, but we must equally in justice say that he has produced a work on those diseases superior to any yet published, and which we imagine is not likely to be soon superseded by a better. The volume is elegantly printed, and the woodcut illustrations by Bagg are beautiful.

ART. III.

Om Sygepleien i Straffeanstalterne i Norge. Ved Prof. F. HOLST.—*Christiania*, 1841. 8vo, pp. 112.

On the Management of the Sick in the Prisons of Norway. By Prof. FRED. HOLST.—*Christiania*, 1841.

IT was not till the recent changes in prison discipline, which have been adopted in Europe and America, that public attention was directed to the sanatory state of prisoners in various houses of correction. In this respect however the Norwegian goals have remained unnoticed, save by a short essay from the hands of the author of the present pamphlet, in 1828. In the month of September, 1837, a commission for this purpose, was formed, and Professor Holst was included among its members. Its aim was to investigate the present state of the houses of detention in Norway, and to propose such measures of reform, as would be most likely to ameliorate their condition.

There exist in Norway two kinds of prisons. The more severely disciplined are appropriated to the greater offenders, of the male sex only, who are denominated slaves, and their place of confinement slave-prisons, (*slaverier;*) the other kind are *tugthuse* or penitentiaries, and contain the lesser criminals of the male sex, with all female convicts. The slave-prisons may be considered as more immediately under the military; the penitentiaries under the civil power. In the year 1840, the total number of criminals of both sexes was, singularly enough, 1840, viz. of men 1528, of women 312, and of this number 1203 males were in the slaverier, or in other words undergoing the severer degrees of penalty. The entire population of Norway is 1,276,300, which gives a proportion of one criminal in 694 inhabitants.

Previous to speaking of the treatment of the sick, Dr. Holst mentions several circumstances regarding the Norwegian prisons, which must naturally influence the health of their inmates. They are often, he says, situated in the immediate neighbourhood of the ditches of the fortress which are usually filled with stagnant water, and the cells themselves are low, and often much too confined to admit of a free circulation of air. In the prisons of Bergen, in particular, we observe by Dr. Holst's tables, that 133 and 152 cubic feet of air are all that is appropriated to each individual in his sleeping cell. Besides this there is a great want in the

Norwegian prisons of proper space within the walls for the exercise of the prisoners in the open air, though in that country this is an object of much less importance than in England, as the greater part of the slaves are employed in chains, upon the public works, without the walls of the goal. The slaves (slaver) rise in summer at 4A.M., and in winter at 7A.M. and retire to rest during the former season at 9, and in winter at 8P.M. For those confined in the penitentiaries, the working period averages about eleven hours per day. The slaves receive in all the prisons 2lb. of bread daily, as also two skillings in money, with which they are allowed to purchase eatables and liquor, (chiefly corn-brandy,) from the shops which exist in all prisons, excepting in that of Vardoehuus. At this last-named spot, the prisoners are allowed the daily sum of five skillings, without any bread, and for this money they purchase food from the stores of the fortress at a moderate rate. Their meat, however, is in a raw state, and the cooking of it within their cells occasions much accumulation of matter prejudicial to health, though their food itself is in general excellent in quality. Spirits are allowed to be sold openly in all prisons, excepting in those of Aggershuus and Trondhjem. Dr. Holst complains that the prison dress is not sufficiently warm for those that work out of doors during the winter, nor is much care taken about its being regularly cleaned and changed. Two prisoners in general occupy one bed, but in the slave-house (slaverier) of Fredrikstad, one bed suffices for three, and in some prisons, the beds are placed like berths in ships of passage, one tier above the other. It must be extremely difficult if not impossible, to preserve cleanliness in a room, where the prisoners not only dwell and work during the day, but also prepare their food and consume it. The arrangements for the cleansing the persons and linen of the inmates are also but little attended to, though in most prisons they are allowed the privilege of sea-bathing. In the district of Vardoehuus, however, few will avail themselves of this privilege, as the water is too cold for the most daring, even in the height of summer. The *slaves* are chiefly employed upon public works, such as quarrying, cleansing the ditches of the fortress, or the streets of the town, and in Vardoehuus are even engaged in the sea fishery, while, at other times, they work within the walls of their prisons at various trades. But as at present constructed, the slave-prisons are by no means adequate to provide labour for all their inmates, for out of 100 able-bodied men, it appears that not less than 26 pass their time in idleness. In the penitentiaries, the men are kept to lighter kinds of labour, as are also the female prisoners, and many of the latter officiate as cooks.

From these preliminary observations Dr. Holst passes to the immediate object of his essay. By a well-arranged series of tables, he presents to us the various accommodations provided for the sick in the prisons, and penitentiaries of Norway. At the same time it must be a subject of regret, that the committee have received from certain goals, documents so unsatisfactory, that perfect accuracy in this statistical account could not be obtained. The attention of the committee was particularly directed to the ascertaining the average number of sick in each prison, the number of visits paid to them weekly by the medical attendant, the proportion of deaths and recoveries, the effect that the situation, aliment, employment, &c., appeared to have upon the health of the inmates, and,

finally, the number of cases of insanity or suicide which had occurred, and if these could be traced to have any connection with the peculiar discipline of the gaol. The number of beds in, and the size of each infirmary within the precincts of the prisons are also required to be given, that the amount of cubic feet of air allotted to each individual may be accurately determined. Nearly sixty pages of Dr. Holst's essay are occupied by these statistical accounts, which from their complex nature, are incapable of analysis, and from the imperfect returns upon which they are based, cannot claim the attention they would otherwise ensure. The author notices in the next place, the deficiencies which call for remedy in the Norwegian prisons, as far as regards the arrangements for the reception of sick convicts, and points out the results of such imperfect measures as have been hitherto adopted. In all, with the single exception of the rude prison of Vardoehuus, the sick man is immediately separated from his fellow prisoners. In general the height of the rooms used as infirmaries is much to be complained of, as in Vardoehuus they are only seven feet high, and in Bergen and Trondhjem only average ten. The Norwegians are not in general fond of bathing, and we therefore are not surprised to find that baths either warm, tepid, or cold, have only been provided in one or two of these localities.

Until a very recent period, the appointment of physician to the gaol has been held often by men not duly qualified to practise, and no Journals of the cases under their care are now forthcoming to satisfy the enquiries of the commission. Nor is the medical attendant obliged by the present rules, to visit daily the patients under his charge; in the prisons of Fredriksteen and Vardoehuus they only enter within the walls, when sent for by prisoners dangerously ill.

Another great irregularity, and a fruitful source of disease under the present system, is the little care bestowed upon the inspection of prisoners at their first arrival within the precincts of the gaol. It appears that this most necessary duty is often delayed from day to day, and that thus many contagious disorders may be, and are introduced among the inmates.

In order to ascertain as far as possible the results of these arrangements for the sick in the various prisons of Norway, the commission proposed in addition the following questions to the medical attendants:

What are the most frequent disorders among the convicts, and what their probable cause? What age, what sex is most liable to these? Can any of the trades, &c., exercised within the precincts of the gaol, be regarded as a cause of ill health? Has insanity showed itself in any of the prisoners in consequence of confinement? and, lastly, do the convicts leave the prisons in the enjoyment of better health than when they entered its gates?

The medical attendants of the gaols were also requested to transmit to the committee as complete an account as possible, of the arrangements under their charge for the reception and care of the sick prisoners, and to note carefully the diseases of which they died, or under which they suffered, as well as the average number of days of sickness in the year, in relation to the number of convicts confined within the walls of the prison.

The answers received to these inquiries of the commissioners tend to

show that the diseases most frequent among the slaves are, catarrhal fevers, agues, erysipelas, frost bites, ulcers, itch, and in Vardoehuus, scurvy. The intermittent fevers occur only at Fredrikstad and Agershuus; in both these places the gaol is surrounded by ditches of stagnant water. Erysipelas appears chiefly upon the legs and ancles of the prisoners, and then, no doubt, is occasioned by the constant irritation of the iron rings which encircle them. The labour to which prisoners are subjected in Norway does not seem in any way prejudicial to health, unless, perhaps, the constant exposure, with insufficient clothing, in the open air, may give rise to numerous catarrhal and inflammatory attacks. During the prevalence of the cholera in Norway, the prisons did not escape the scourge; but, though the number of cases in the slave-houses far exceeded those in the towns, the mortality does not appear to have been greater than among the free population of the country.

It is a remarkable fact that the number of those who became affected with insanity during their abode in the gaols, was far less, on an average, than among the free inhabitants of the towns or country in Norway. Almost all the medical men concur in stating, as an undoubted fact, that the majority of the prisoners leave their place of confinement in better health than when they entered it.

Professor Holst next proceeds to illustrate, by admirably constructed tables, the information which has been obtained regarding the proportion of sick in each prison to the healthy inmates. The general average of the whole six *slave-houses*, appears to be 1 : 15, while each sick person was, on an average, detained twenty-five days in the infirmaries. In the penitentiaries the former were only as 1 : 29, and the average days of illness for each sick prisoner only 18.

The mortality in all the six slave-houses has been found to be as 1 : 51, and in the penitentiaries as 1 : 49; while the general mortality among the free population of Norway is 1 : 51. We thus are brought to the somewhat startling conclusion that the proportion of deaths in Norway is least among those whose crimes are visited with the severest chastisements:

"We should certainly," remarks Dr. Holst, "have expected the contrary, when we consider the unhealthy position of many of the *slave-houses*, the narrow space allotted to each prisoner, the age of those detained, and the filthy mode of life permitted in gaols, and we can only explain the greater mortality of the penitentiaries by the fact, that in the latter the prisoners work in close and ill-ventilated rooms, while the slaves are chiefly employed in hard labour in the open air."

Out of 10,867 prisoners, nine have committed suicide during the last ten or twelve years, and seven have perished by accident; six of these having been drowned by the upsetting of a boat in the neighbourhood of Trondhjem.

From a careful comparison of the present statistical tables, with those referred to in a former number of this Journal, we find that the mortality in the Norwegian prisons has been considerably less than in the gaols of other countries, under the older systems of prison discipline, and all will concur in the hope expressed by Dr. Holst, that when the deficient arrangements, now in force, have been improved and altered by the commission, we may expect a much greater reduction of deaths among the prisoners. It were indeed greatly to be desired, that all statistical accounts could be drawn up with the careful attention which has evidently been bestowed upon these investigations of Professor Holst.

Art. IV.

The Transactions of the Provincial Medical and Surgical Association. Vol. XI.—*London*, 1843. 8vo, pp. 568.

This volume is more than usually scanty in practical communications, which may be owing in part to the weekly journal of the association affording a more ready channel in publication, and not, we trust, to any greater apathy of the provincial practitioners to promulgate in a durable form some of the results of their large experience. We well know the exertion required, (particularly to one but little accustomed to composition, and whose time is very fully occupied in the distracting duties of an active medical practice,) to sit down and to write for the press; but is it not a duty which elder practitioners owe, both to society and to their own profession, not to let their experience die with them, but to communicate modes of treatment, which, by long experience, they have found to be beneficial, and of the truth of which they are sure, to their younger and less experienced brethren?

There are enough and to spare of systematic books and treatises, in which an attempt is made to treat fully and completely a science or parts of it which is incomplete and fragmentary. What is wanted is, that those who are experienced should communicate as briefly as they choose what they know about the treatment of those diseases on which they have fully made up their minds, stating those rules in distinguishing diseases, or in judging their progress or termination by which they themselves are guided, and giving hints as to remedies, sick room management, and similar details apparently small but really most important, such as they themselves would have been glad of in their earlier career, and which are now so willingly read and used by those who go to books in their difficulties—not a small number in this reading age. One of the chief benefits of the Provincial Association was to afford a stimulus to such a useful exertion, and a channel for the results; and we regret that this volume should not contain more proofs that this object has been more fully accomplished. Not more than sixty pages out of 567 are occupied with original papers on practical subjects. These few we shall analyse, with the exception of the essay of Mr. Turner, On Dislocations of the Astragalus, which we reserve for a separate notice on another occasion.

Art. iii. *Experimental and Practical Researches on the structure and function of Blood-corpuscles, on Inflammation, and on the Origin and Nature of Tubercles of the Lungs*, by William Addison, f.l.s. This is a paper of great interest, containing, as it does, the results of a very extended series of microscopic inquiries, on which the author has been for some time engaged. Some of these results, to which no doubt can be reasonably attached, are of great value; others, we fear, will not stand the test of further investigation, particularly with a microscope of qualities superior to that which we understand Mr. Addison to have been in the habit of employing. Knowing what differences of opinion are liable to occur even among those possessed of the best instruments, we cannot be satisfied with conclusions based upon researches carried on with one of inferior quality. We shall briefly indicate, for the guidance of our readers, those points in Mr. Addison's researches which we deem most

worthy of favorable attention, and those which must, in our opinion, be received with caution.

In the first section, on the *blood-corpuscles of man*, the author directs attention prominently to the *colourless* corpuscles, which, on account of their correspondence in size and outline to the red discs, are very apt to escape notice. There can be no reasonable doubt that these are identical in character with the (so called) lymph-globules of the lower vertebrata, which are readily distinguished from *their* red discs by the large size of the latter; they are acted upon in a peculiar manner by liquor potassæ, being made to burst and discharge a number of contained granules. Mr. Addison directs attention to the fibrous arrangement which fibrin presents in coagulating, and which may be well seen in watching the coagulation of a small quantity of the upper stratum of sizy blood under the microscope. To this circumstance Mr. Gulliver also has attracted notice, and there seems much reason to believe that the simple coagulation of fibrin in this form is the origin of the ordinary fibrous tissues, of which Dr. Carpenter has pointed out a beautiful example in the membranous basis of the egg-shell.

In section ii. on pus corpuscles, the author expresses the opinion—founded on their correspondence in appearance and in behaviour with liquor potassæ, with the colourless corpuscles of the blood—that the two have the same origin, and concludes "that pus corpuscles of all kinds are altered, colourless blood-corpuscles; and that all limpid, colourless, abnormal discharges, are effusions of the liquor sanguinis, containing more or less of the fibrin and corpuscles in varying proportions." In regard to this conclusion, though it accords with that of Dr. Barry, we must take leave to express some doubt. It seems to us that the pus corpuscles have something too specific in their *character*, if not in their *appearance*, to enable us to regard them as merely altered colourless corpuscles; and we think the idea of Dr. Carpenter a probable one, that they hold the same relation to the *liquor puris*, as the colourless corpuscles to the *liquor sanguinis*. (Report on Cells, § 48.)

In the third section, on the blood-corpuscles and on the lymph-globules of the frog, Mr. Addison endeavours to prove that the latter constitute "the inner vesicle or central portion of the red corpuscle." This we think an untenable position, for reasons which we cannot now enter upon fully; but the marked want of correspondence between the sizes of the two classes of corpuscles in vertebrata, and the total absence of the red discs in invertebrata, seems to us a sufficient objection to this view, until much more satisfactory evidence be adduced in its favour, than that brought forward by Mr. Addison.

The fourth section, on inflammation, contains little else than an account of the changes in the number and movements of the lymph-corpuscles of frog's blood, which were witnessed by Mr. Addison, as a consequence of the application of irritants. This subject is one of extreme interest, as opening an entirely new line of inquiry on this previously-exhausted subject; and, short as this portion of Mr. Addison's paper is, we consider it the most valuable of the whole. The inquiry cannot, however, be regarded as complete until it has been prosecuted in regard to warm as well as cold-blooded animals; since, as Dr. Macartney and others have pointed out, it is doubtful how far real inflammation can be said to take

place in the latter. It will, perhaps, be more correct to say, that the colourless corpuscles accumulate and multiply in vessels actively engaged in the *formative process;* a conclusion which harmonizes with Dr. Barry's results, and does not run counter to the existence of a similar condition in inflammation, in which there is a morbid exaggeration of that process.

The succeeding section, on cells, contains many interesting views of the functions and development of these constituents of the organism, whose importance in the animal as well as the vegetable economy is now coming to be generally acknowledged. Mr. Addison may fairly claim to be among the foremost in developing these views; but we cannot admit as proved, or even as probable, that the circulating cells (or in other words, the colourless corpuscles of the blood) ever became fixed, and transformed into the elements of tissue. Both they and the tissue-cells are descendents of the primordial cells of the embryo; but when once the separation between the stable *solids* and the circulating *fluids* is established, and their respective functions are specialized, we doubt the conversion of the cells of the latter into those of the former. The case of the epithelial cells, which both Mr. Addison and Mr. Barry consider the strongest in support of their view, appears to us the one most easily upset; since the researches of Mr. Bowman and Mr. Goodsir have shown the existence of a sheet of structureless membrane, lying beneath the epithelium and epidermis, and effectually separating them from the blood-vessels of the mucous membrane and skin, except so far as the transmission of *fluids* is concerned. This may be well seen in the ultimate tubuli and vesicles of the glands, which are formed of nothing but this basement or primary membrane, on the *outside* of which the vessels are distributed, whilst the epithelium cells line their interior. There is a continual re-formation of the latter, as a part of the process of secretion; and it seems to us beyond all probability that colourless blood-corpuscles should be continually escaping from the capillary vessels, passing through the basement membrane, and becoming transformed into epithelium cells on the other side. It seems to us that both the observers who uphold this doctrine, have been led into error by the resemblance which exists among nearly all cells at an early stage of their development.

An account of Mr. Addison's views on the aeriferous structure of the lungs, which he considers necessary to explain the nature and primary seat of tubercles, constitutes the sixth section. These views have been communicated to the Royal Society, and published in the Philosophical Transactions. In opposition to the doctrine of Reissesien and others, Mr. Addison thinks he has derived ample evidence from various experiments "that the bronchial tubes, after subdividing into a multitude of minute ramifications, which take their course in the cellular insterstices of the lobules, terminate in their interior in symmetrically branched air-passages and freely-communicating cells." He considers these to be formed at the first inspiration by the pushing forward and distension of the membrane composing the ultimate bronchial subdivisions. "The symmetrically-branched air-passages, thus formed by respiration, are no longer tubes. I have, therefore, distinguished them by the term 'lobular passages;' and a section of these passages shows the *oval foramina*, leading from cell to cell, so conspicuous in a thin layer of inflated and dried lung. The air-cells of the lungs, then, are formed at birth, by the pres-

sure of the atmosphere acting upon the extremities and against the sides of the *intralobular* bronchial subdivisions. They have not a general and indiscriminate inter-communication, for there are no anastomoses between the intralobular subdivisions of the bronchi; therefore, the cells forming one lobular passage have no communication with those of the adjoining ones, except by their common opening into a larger ramification." These views differ from those recently promulgated by M. Bourgery, chiefly in this,—that the latter speaks of the lobular passages (under the designation of *canaux labyrinthiques aërifères*) as turning back at the boundary of a lobule to reenter its interior, and terminate in some of the deeper canals. As to the general fact that the bronchial tube terminates in a series of cells, communicating with each other by oval foramina, we think that the inquiries of Mr. Addison and M. Bourgery leave no doubt. As to the mode of their production, however, we incline rather to the opinion of the latter, who seems to consider that these cells are formed like other cells, and that the air finds its way into them by the rupture of their walls at a particular spot, so that a linear series of cells becomes converted into a passage; and who describes this process as taking place during the whole period of youth, so that the number of air-cells in the lungs continues to increase up to adult age, after which the number diminishes. The idea of the formation of the air-cells by the act of inspiration, entertained by Mr. Addison, seems to us to be too mechanical. "The blood-vessels," continues Mr. Addison, "lie exterior to or between the lobular passages; and as the membrane forming one of these passages is pressed by the inspired air into close contact with that of the adjoining ones, it follows, that the capillary blood-channels ramify or run between two membranous layers, and any increase in the diameter of these channels must separate these layers."

Mr. Addison's memoir concludes with an account of his views on the structure and character of tubercle. "If a tubercle, or even the tissue of the lung near it, be slightly compressed between two slips of glass with a drop of water, it will crumble down and break to pieces; the fluid at the same time being rendered quite white or milky. This white appearance is attributable to a great number of minute objects, the assemblage of which constitutes the substance of the tubercle. They consist, for the most part, of molecules, granules, and granulated corpuscles, of various sizes; of aggregated granules without any tunic; and of collapsed tunics without any granules. These objects are mingled with a great many shapeless flakes and filaments, which are no doubt fragments of the membrane of the air-cells and of the minute blood-vessels, which, when involved in a tubercle, become so extremely brittle, that they must necessarily form a considerable proportion of the objects occupying the field of the microscope. The granulated corpuscles of a tubercle are sometimes very large, and the molecules and granules, which are very conspicuous, may frequently be seen upon the point of escaping from them." The similarity of these corpuscles to the colourless corpuscles of blood, leads Mr. Addison to the conclusion of their identity, to which we think the same objection applies, as to his similar idea in regard to the pus-globules and the epithelium cells. "The semi-transparent forms of tubercle and tubercular infiltrations owe their peculiarity to a great relative amount of granulated corpuscles; whereas the opaque white forms

of tubercle are attributable to great numbers of isolated granules. Tubercles of the lungs are extremely common. They are at first visible as minute white-rounded bodies, dispersed at more or less distant intervals in the vesicular tissue of these organs; and very frequently they elude observation, not being discernible unless specially searched for with a lens, in thin macerated sections of the lung, slightly extended on a dark surface." Mr. Addison considers that "there is no distinction whatever between the spots of lepra in the skin, and tubercles in the lungs; if we except those arising from the different situation and function of the two tissues." The essential character of both diseases he believes to be an abnormal accumulation of epithelium cells, which produces more injury in the lungs than on the skin, on account of the delicacy and vascularity, and functional importance of the former; and also because the accumulation cannot be readily discharged. And, according to the view already stated, these cells he regards as neither more nor less than altered colourless corpuscles of the blood. "If the matter deposited in the air-cells in cases of pneumonia, and termed 'hepatization,' be examined by the microscope, objects in all respects similar to those which compose a tubercle are seen, mingled with pus-corpuscles." We believe that the view of Gerber and Gulliver will be found to be more correct—that the matter thrown out in pneumonia occurring in a healthy subject, is *organizable liquor sanguinis*; whilst the essential character of a tubercular deposit is *unorganizability*, indicated by its granular character, and the imperfect formation of its cells. Between the two extremes, there seem (as might be expected) to be all grades of intermediate conditions, perfect cells and fibres presenting themselves, to a greater or less extent, in deposits which are ranked as tubercular. For some remarks upon the observations of Gerber and Gulliver, which set this matter in what we conceive to be its true light, we may refer to Dr. Carpenter's Human Physiology, §§ 609 and 715.

ART. IV. *On the Long Issue in the Scalp*, by Dr. Wallis. Dr. Pritchard some time since directed notice to the advantages of a free incision through the scalp in chronic cerebral diseases, and from this paper it appears to be a practice much used in the Bristol Infirmary; Dr. Wallis who is one of the Physicians of that institution, having been led to adopt it from the surgical practice of Mr. Smith, the senior surgeon, who in cases of severe injury of the head without symptom of fracture or depression found a free incision through the scalp useful both from the local loss of blood, and the wound becoming an advantageous counter-irritant.

The incision is made in the following manner:

"Let the head be shaved entirely, and have the patient brought near to the right side of the bed; raise the head by a hard pillow, and put a towel round his neck to receive the blood; let an assistant keep the head steady, and at the same time draw the scalp downwards in all directions, so as to strain the calvarium as much as possible; the scalp will divide with so much more ease. In this, your own left hand will materially assist, by placing it at the upper and back part of the head, commencing the incision between your thumb and fore-finger, as far back as the lambdoidal suture; press the scalpel sufficiently down so as to divide the scalp entirely through at once; carry on the incision directly along the sagittal suture as far as the hair grows on the scalp, and which will cover the cicatrix after the issue is healed up. The length of the incision thus made will be in the adult

about seven or eight inches; take care that the scalp be divided entirely, and perfectly through, so that the edges of incision will separate so far as to enable you to introduce a dossil of lint, rolled up hard, as thick as two fingers, and which should be well soaked in spirit of turpentine; this answers the double purpose of increasing the effect of the incision, and makes suppuration come on earlier, and will usually assist in stopping a further loss of blood. There is seldom more than six or seven ounces of blood lost. In those cases where depletion has been carried to a sufficient extent, and the further loss of blood is unadvisable, it may be prevented in the following manner: The instant the incision is completed, close the sides of the wound and make pressure upon it with your hand, whilst your assistant hands the lint, well soaked in the spirit of turpentine, and rolled up firmly of a proper length, so as not to extend beyond the extreme length of the incision, as it would be inconvenient in strapping down the wound sufficiently to check the flow of blood; a little flour and dry lint may be superadded, but the dossil must not be made so thick as to rise much above the edges of the wound, or else the adhesive straps will not be secure by being elevated, and thereby prevented from adhering near the edges of the incision. Should the incision be imperfectly made, that is to say, not entirely through the scalp, the arteries may only be partially divided; in which case they will continue to bleed, notwithstanding the pressure you may have made; of course the arteries will require to be completely divided, and allow them to retract and cease to bleed."

When there is much restlessness and delirium, and a risk that the dressings may be disturbed, and a further loss of blood is not desirable, Dr. Wallis applies the actual cautery to the bleeding vessels by touching them with the common thick plaster-knife heated in the fire. The adhesive straps should be an inch wide, and ten inches long, supported by a double-headed bandage, removed the next day, and replaced by a bread-and-water poultice on the top of the lint. When the lint comes out, another similar dossil may be introduced, and in a few days a double row of peas, seventy or eighty strung together, filling up the issue, which is to be kept open three or four months. Most cases also require caustic to be applied every five or six days, to ensure the due discharges. Three cases are detailed of amaurosis with pains in the head, giddiness, and other symptoms of chronic cerebral disease. In two of these the incision was followed by restoration of sight, and removal of the head symptoms, in the third by some improvement.

Nine cases follow of hemiplegia from cerebral apoplexy. All were bad cases, the symptoms either unmitigated by ordinary depletion, or increasing in severity. In the majority, the immediate improvement from the incision was marked, and the return either to perfect restoration of power or to mere improvement, was gradual.

Dr. Wallis states that this remedy is useful in epilepsy, depending on chronic diseases of the brain; one case is given in which it was of marked benefit, but the age of the patient is not stated, nor had a sufficient time elapsed after the operation to decide as to its curative effect.

In hydrocephalus Dr. Wallis asserts that the incision, if made before effusion has taken place, may prevent its occurrence. But no cases are given to prove this. Two cases are given of convulsions and insensibility following scarlatina in which the incision was followed by a return of consciousness and a cure; but a third case is also reported of a brother of one of the patients in which the same symptoms were relieved by a blister down the spine. We need hardly point out the difference between these cases and those of genuine hydrocephalus; the symptoms

in both may depend on serous effusion, but in the latter disease a slow inflammatory condition of the brain has preceded the effusion, whereas in the former an effusion of serum seems often to take place in the brain from a general dropsical disposition of the body, and from which patients often recover with great rapidity. In genuine hydrocephalus, such a stage is, as far as we know, past hope.

Two cases of genuine hydrocephalus are reported in which the incision was made after the symptoms of effusion had set in; there was some improvement after it, but both patients died.

Three cases called inflammation of the membranes of the brain, (symptoms not given,) in which vigorous depletion had been used without relief, and the incision was followed by conspicuous improvement and recovery. Dr. Wallis states that these are but a few of the cases of the same disease which have happened in his practice, and that "no one case was unsuccessful where the incision was made before a destructive effusion had occurred."

In one case of delirium tremens in which depletion had been tried without benefit, and opium increased the restlessness, the incision removed the symptoms, but the patient returned to his old habits of drinking, and died suddenly.

Four cases of fever are reported attended in the early stages with irritation of the gastro-intestinal mucous membrane, and in the latter with delirium, insensibility, involuntary evacuations indicating effusion in the brain, and a case of scarlatina with the same cerebral symptoms, in all of which the incision was made, and the patients improved and recovered. In a sixth, the relief was temporary, and in the seventh the issue was fatal from loss of blood, the patient having torn off the dressings.

In erysipelas of the face and head with cerebral symptoms, Dr. Wallis thinks the incision very valuable as it relieves both conditions, the disease of the skin and the brain. Two cases are given.

The paper concludes with a case of hysteria in which the fit of unconsciousness lasted four days. The incision was made, the patient awoke, rallied, and we can easily believe Dr. Wallis when he adds, "I never saw her in the house afterwards."

This very severe remedy, an incision through the scalp to the bone seven inches long, and converted into an issue capable of holding eighty peas, is one, which, it is needless to say, should not be adopted unless other means fail. But in diseases of the brain of a very hopeless character, when ordinary means do not relieve, then sometimes, perhaps, "melius est anceps remedium quam nullum;" but the Lord save us from Dr. Wallis and his issue!

ART. V. *Case of Fracture of the Spine, treated successfully by extension;* by W. H. CROWFOOT, of Beccles. A. C., æt. forty-two, whilst driving a carriage under an archway was bent double by the back of his neck coming in contact with a beam. Complete paralysis both of sensation and motion of both legs, great deformity about the ninth to the twelfth dorsal vertebra, with posterior curvature, the spinous processes of the ninth and tenth vertebræ were divided from each other, the body of the ninth having been forced forward, whilst that of the tenth projected backwards: inability to empty the bladder. No doubt existed of

displacement of the bones of the spine and pressure on the cord. A broad and well-padded belt was passed round the chest and under the arms, and it was fixed from behind to a strong staple at the upper end of the frame of the bed: a similar belt was buckled round the body just above the pelvis with two strong straps attached to it, one before and the other behind, each having a strong iron ring at its extremity; these straps were brought between the thighs and made fast to the pulleys. Gradual but considerable extension was now made which evidently diminished the curvature and restored a certain degree of sensibility to the legs. This excited a hope that if the bones could be retained in their amended position and means were taken to obviate inflammation the cord might resume its functions. The patient was placed on his back on a firm bed, so that his fæces could be removed without disturbance and the most perfect rest enjoined. In the first ten days, from six to ten ounces of blood were daily taken away from each side of the spine alternately, with great relief to the patient's feelings, who was cautiously moved on his side by the sheet. The patient steadily improved; in three weeks he could move the right toe; in two months he could support himself with but little assistance, and in twelve months was able to resume his work as a coachman. There remains some deformity and an unusual separation between the ninth and tenth vertebræ, and horse exercise, or even walking, is apt to produce pain and numbness, otherwise he is in perfect health.

We give this case, although a single one, from its importance and rarity. The treatment is highly creditable to Mr. Crowfoot, and the whole paper (short though it be) indicative of a man of excellent sense and judgment.

ART. VI. *Case of Paralysis of the Serratus Magnus, which caused the lower angles of the right and left Scapulæ to become disengaged from the Latissimus Dorsi.* By JOHN M. BANNER, Esq. The above title and the following extract give the main features of this somewhat curious case.

"The circumstances which more particularly strikes the attention in the present case is the appearance of the scapulæ, more especially when the man attempts to raise and make use of his arms. In the quiescent position, the base of the bone, instead of lying parallel to the spine, is approximated to it at the lower angle, and stands out from the ribs a distance of two inches, leaving between the scapulæ a deep hollow; the upper angle being drawn high up in the neck, appearing on both sides, to the observer in front, midway between the shoulder and ear. The clavicle is in its natural position, as is also the acromion process of the scapulæ, to which it is articulated. When the patient attempts to raise the arm all these appearances are much increased. The base of the scapula approaches nearly to a right angle with the spine, forming, with the base of the scapula of the opposite side, a very obtuse angle, and both stand out about three inches from the ribs; the arm cannot be raised beyond the horizontal position. After stooping to a right angle to the lower extremities he is quite unable to recover the erect position without help, and there is an evident lateral curvature of the spine; both which may be consequences of the power of the longissimus dorsi, the sacro-lumbales, and the deep-seated extensors of the spine. In his ordinary position the upper part of the body is thrown back, evidently to balance the weight of the head and part of the body, which in the healthy person is supported in the completely erect position by the before-named muscles." (pp. 344-5.)

ART. VII. *On Matico;* by Dr. JEFFREYS, of Liverpool. This paper contains a botanical description of the Piper angustifolium or Matico, and some cases in which it was used successfully as a styptic. The application of the under side of the leaf to leech bites which bleed profusely, and to small arteries which have been wounded, seems decidedly to arrest the hemorrhage; taken internally as an infusion it has been useful in hemorrhage from the intestines and in discharges from the urethra and vagina. Dr. Jeffreys has brought forward sufficient evidence of its value as a styptic to induce a fair trial to be given to it. There are two kinds of matico imported from South America, green and yellow; the latter is the ripe plant and should be obtained. The infusion is made with half an ounce to a pint of water, and the dose is three tablespoonsful four times daily.

ART. V.

Die Krankheiten des höheren Alters und ihre Heilung dargestellt von Dr. C. CANSTATT, &c.—*Erlangen*, 1839.

On the Diseases of Old Age, and their Cure. By Dr. C. CANSTATT, Royal Bavarian Medical Jurist, &c.—*Erlangen*, 1839. Two Vols. 8vo, pp. 268, 422.

FEW English writers have treated on the hygiene of old age, and fewer still on its diseases. Welsted's 'Liber de Ætate vergenti,' and Floyer's "Gerocomica," both published in 1724, are among the earliest. Half a century later, Benjamin Rush wrote an essay on the state of the mind and body in old age, and some remarks on the diseases of aged persons; and in 1838, Sir Anthony Carlisle gave his experience on the diseases of childhood and old age to the world in his 'Practical Observations on the Preservation of Health," &c. Fifty octavo pages only of his small volume are devoted to the hygiene of old age. Foreign literature has been much more fruitful in works on the subject; but many of them are merely small pamphlets, others are adapted mainly to the popular reader, and the greater number are monographs on some special diseases of old age. A book comprising in one comprehensive plan the information diffused through these varied publications and through the works on general pathology must, therefore, be considered a desideratum for the physician. Such is Dr. Canstatt's publication, with the additional recommendation that the special branch of pathology treated of is brought into relation with the newest physiology and general pathology. We have read the work carefully, and we can give it our unqualified approbation. Some little faults excused, it is a model of composition. The subject-matter is well arranged; the details are accurate; the style of writing classical; the description of particular diseases clear and vivid. That there is *no* room for criticism could not be affirmed of any book; but we would say, there is so little here that we shall make our review almost entirely analytical.

Old age (*senectus*) is the period of natural decline. Plants and animals describe an imaginary semicircle. They commence from a vital point, are gradually evolved until they attain their climax, and then they as gradually decline to death. The segment of the circle from the cli-

macteric point to death is old age, or, as our author terms it, the *Involution-period*, as the antagonistic segment is the *Evolution-period.* This involution-period is characterized, physiologically, by a return of the organism to the commencement of the evolution-period, although its direct course is to its mother-earth. On this hypothesis, Dr. Canstatt occasionally founds a comparison between the physiology and pathology of childhood and old age, and a demonstration of their identity at many points. We need not say that these views are more curious than useful. Fortunately, we do not find the pathology of our author infected with them; they are confined entirely to his physiological views.

At what age does the period of decline commence? Hippocrates fixed it at seven times seven years, or forty-nine; and its termination, or old age, at ten times seven, or seventy years. Riverius subdivided it into three minor periods: 1, *senectus prima*, extending from the fiftieth to the sixtieth year; 2, *ætas ingravescens*, from the sixtieth to the seventieth; and 3, *decrepitudo*, or the days of labour and sorrow mentioned by the psalmist, and which fill up the interval between the age of seventy and the grave. Experience, however, plainly teaches that the periods of decline cannot be measured with anything like accuracy. The poetical declaration of sacred writ, that "wisdom is gray hairs to a man, and an unspotted life is old age," is often verified in a very matter-of-fact manner. A green old age, a *senectus prima*, at three score and ten, is often the reward of temperance and moderation in living, while decrepitude overtakes the moderately-intemperate at fifty, and death itself comes on but a little later. The involution of special organs cannot be taken as an index of the general involution. Muscular power often fails long before the intellectual, and *vice versâ:* often an old man of seventy, who has long been toothless, may be seen walking about as actively and as upright as a man of forty. The cessation of menstruation in females indicates commencing involution; but we can only apply this analogically to males, for the power of procreation is possessed by the latter to an advanced period of life. Our author, making the involution-period and old age conterminous, leaves it to the practitioner to ascertain the latter by determining the limits of the former in each individual case. And on this view is the limitation of his subject constituted. All diseases of old age are not necessarily diseases of the involution-period, for aged people are often equally exposed with the young to the causes of diseases in general. But these may be modified by the involution, and hence two pathological divisions of the subject, the one comprising those diseases necessarily connected with the physiological changes of decline, the second including those which are only modified by the physiological conditions of the involution-period.

Anatomy and physiology of old age. Dr. Canstatt remarks that a knowledge of these is essential to the right knowledge and treatment of disease. The unwary practitioner, for example, is often deceived by an apparent hardness or fulness of the pulse into actively depleting measures and a fatal destruction of the vital power, when the indication in question is dependent entirely upon hypertrophy or ossification of the radial artery. The general appearance of old people is well known. According to Quetelet, man arrives at his maximum weight at forty, and woman at fifty years of age. According to Fischer, the specific gravity of old

people is diminished, so that poor old women might float when thrown into water, and yet be innocent of witchcraft. As the hair turns gray the skin becomes less moist, and more parchment-like, and all the cutaneous secretions are impeded. Hence the difficulty of establishing critical discharges through the skin, and the propriety of directing immediate attention in case of failure, to the more practicable organs—the kidneys and bowels. The contractility and vitality of the cellular tissue is diminished in the involution-period; the tissues generally are consequently less speedily and effectively renewed, effete parts less readily taken up by the absorbents, and morbid products more readily deposited from the slowly-circulating blood, thus predisposing to cancerous degenerations indurations, &c. The osseous system partakes in this vascular inactivity, and the controversy respecting the non-union of the neck of the femur, the olecranon, &c. in case of fracture, might easily have been avoided, as our author observes, by a reference to the physiology of old age. The diminished deposit of fat in the cellular tissue renders a warmer clothing necessary.

The changes in the vascular system are of importance with reference to the diseases of the involution-period. According to some writers, the heart is less, and its walls thinner; the muscular fibres small and flaccid, and portions here and there appear to have a membranous structure only. Passive aneurisms are frequent with softening or dilatation. Fat is deposited round the heart, and bony matter in its inner membrane and in the valves, giving origin to peculiar affections. The arteries are also said to be diminished in caliber; the smaller ones obliterated, and the larger partially ossified, or deprived of their gelatine: hence their liability to rupture. Baillie, Stevens, and Astley Cooper have remarked arterial ossification so frequently in old people, that they consider it almost the normal state. Bizot's recent researches in some degree have set aside these statements. This observer asserts, in contradiction to Béclard, that the walls of the left ventricle and the septum increase in thickness as age advances; in contradiction to Bichat, he found that the aorta was increased in caliber in old age, as indeed are all the arterial trunks. But the opinions of the English writers just mentioned are confirmed by Bizot's observations. In short, the two great changes in the arterial system are: 1, gradual increase in capacity, and hypertrophy of the cardiac structures; and 2, the deposit of a new substance in the middle tunic of the arteries which gradually destroys their fibres, and changes them into an atheromatous matter. Other alterations of structure are doubtless connected with the latter. Opacity of the membranous portion of the semi-lunar valves is very frequent after the age of thirty-nine. It was observed by Bizot in 80 females out of 100, aged from sixty to eighty-nine years, and in 92 men in 100 of the same age. Spots of ossification frequently appear in the same structures in females about the age of sixty-eight, in men at the age of forty-nine. The *corpora aurantii* are often cartilaginous and increased in size. The concretions on the aorta and arteries of old people are composed of crystals, according to Gluge. The last-mentioned observer found these crystals also on the surface of the heart. The veins rarely ossify; Bichat never witnessed this morbid change. They become dilated, sometimes in a remarkable degree, and varicose; especially in the liver and brain.

The change in the fibrous, muscular, and osseous structures of old age are well known. The tendons ossify, the bones are devoid of medulla, more brittle, and thinner and smaller; the muscular fibres waste, occasionally ossify, and are sometimes changed into a fatty substance; in which case, the bones are also softened. Gluge states that it is not the muscles themselves that are changed, but that drops or globules of fat are deposited among the primitive fibrils. The cartilages of the larynx are rarely found not ossified (more or less) after the age of fifty. The cartilaginous rings of the bronchial tubes ossify also, and the cartilages of the ribs. The process proceeds from the centre of the cartilage to the circumference. Fibrous cartilages rarely change; the ligaments of the spine are frequently found ossified; the cartilages scarcely ever. Bone may be thus united to bone, as the ilium to the sacrum, the *ossicula auditus* to each other, &c. The serous membranes are often found dry, thick, and opaque; and ossification of the arachnoid, of the lining of the pericardium, and of the serous membrane of the eye have been observed.

The changes in the nervous system are not less numerous and remarkable. Less water and more albumen enter into its composition. The brain and spinal cord are harder, yellowish, and dry; the gray substance diminishes; the neurilema is thicker and more fibrous. The brain and nerves diminish in size and weight. According to Desmoulins, the brain at the age of seventy is from a fifteenth to a twentieth lighter and smaller than at middle age.

Canstatt proceeds to details the state of the alimentary, respiratory, urinary, and sexual systems in old age at great length, as also those observed in the organs of the senses. Respiration, manducation, digestion, and assimilation, absorption, secretion, &c. are reviewed, together with the functions of the liver, spleen, and intestinal canal. In considering these various points, reference is constantly made to the most recent views: Schultz's, for example, (lately noticed by us,) are noticed here. The secondary pathological changes consequent upon the morbid are also illustrated. This second chapter closes with the following apt description of the "soul-life" of the old man, which we quote as a specimen of our author's style:

"The intellectual powers of the aged usually continue unimpaired longer than the physical. The experience of a long life has ripened the judgment; hence the wisdom of the old is proverbial. But this spiritual life is nourished rather from matter already stored up, than enlivened by fresh additions through the external senses. The functions which assimilate these to the inner self are wanting. The impressions made on the senses are imperfect, and lead the old man to form erroneous ideas and judgments with reference to the outer world; only his experience comes in to his aid and corrects his error. The imaginative powers of the old man are lost; he views the future, for the most part, as gloomy and sorrowful; he is serious, and little susceptible of joy. His memory fails, yet the recollection of the circumstances of his youth is fresh, and the general law seems to hold good, and in the aged soul, as in the aged body, those faculties which appear the earliest are active the longest. The aged man is observant, and thinks deeply on particular circumstances. He carries his affairs of business into the depths of his soul. Caution and profound thought take the place of early levity. The honour of a cautious and mature judgment belongs to the aged. His conclusions bear the stamp of deep thought and long experience. The fire of the passions and emotions burns dimly in him; he is now free from the storm which once roused an uproar

in his soul. Conscious how transitory are both joy and sorrow, he looks calmly and self-collectedly on the circumstances amidst which his short life is prolonged. The present has no value for him; he lives only in the recollection of the past, and is an intolerant censor of the present, because he compares the shadows of age with the brightness of his youthful years. The old man easily becomes egotistical, mistrustful, superstitious, misanthropic, covetous, mean-spirited. Many old people are remarkable for irritability of temper and disposition, and for a morose and intolerant manner, so that they are a burden and a nuisance to all around them.

'Multa senem circumveniunt incommoda; vel quod
Quærit, et inventis miser abstinet, et timet uti,
Vel quod res omnes timide gelideque ministrat;
Dilator, spe longus, iners, avidusque futuri,
Difficilis, querulus, laudator temporis acti
Se puero, censor castigatorque minorum.'—HORACE." (pp. 89-90.)

We pass the fourth chapter, on the climacteric periods, without remarks; from the fifth, on the etiology and hygiene of old age we shall make some excerpta.

Dr. Canstatt thinks that in the present age corporeal health and strength are offered up to the moloch of (so-called) civilization. The existing generation, he thinks, presents fewer examples of long life than the departed. Less civilized nations and individuals, whose occupations demand manual without intellectual labour, arrive at a greater age than nations and individuals with whom the contrary happens. The most numerous examples of longevity are, he asserts, to be found amongst the poor, laborious, and illiterate. This statement is, doubtless, positively true, but relatively false. It is positively true, because the poor and labouring classes are the more numerous. Dr. Canstatt does not bear in mind the important fact that high intellectual powers are often the result of weak corporal powers, and *vice versâ*, and that the controlling force of society is exerted upon those in whom the innate intellectual power predominates by virtue of which they are attracted to those pursuits requiring superior mental qualifications. Hence the apparent greater mortality of the class. It should be added, too, that the pursuits to which they are drawn necessarily place the individual in a state of intellectual warfare, and are accompanied by much mental anxiety—a condition of mind much more injurious to the vegetative system than any intellectual efforts. The physician, barrister, merchant, or artist, is much more exposed to this wear and tear of struggle and anxiety than the clergyman or university professor. These latter have not the common anxieties of life superadded, and as a stimulus to their mental activity. Blumenbach died at the age of eighty-eight; Lord Lynedoch is above ninety; the present Archbishop of York is an advanced octogenarian; the late Earl of Cathcart was eighty-eight when he died; Talleyrand was about the same age: the latter may, however, be an example of the power which hereditary longevity has of counteracting the wear of a stormy life. This hereditary longevity is one of the best established facts in physiology. There is scarcely a graveyard in the United Kingdom without illustrations of it.* And although as a general rule temperance

* We wish some one competent to the task would undertake to investigate hereditariness. The subject has never been considered in its totality, and would amply reward the *scientific* inquirer.

in youth is the surest guarantee for that old age which "as a lusty winter is frosty but kindly," yet there are many with the hereditary gift who have "applied hot and rebellious liquors to their blood," and yet walk erect at four score. The following are the marks of the constitution which predisposes to longevity:

"Such subjects grow slowly and regularly: the head is small, relatively, to the body; the forehead rough and covered with wrinkles; the neck neither long nor thin, nor swelled out; the complexion in youth not too florid. They have also sound closely-set teeth, which are sometimes reproduced in advanced life; a broad and deep chest; round full shoulders; a flat and contracted belly; strong torose extremities, thickly covered with stiff hair; a rough skin; and the hair of the head harsh, bristly, and rather blond than black. Early grayness, without baldness, is a mark of longevity according to Bacon. The respiration is easy, full, slow, regular, and scarcely observable; the voice strong; the pulse slow, strong, and not easily altered in rhythm. The cutaneous secretion must be free, but not profuse; the renal secretion small; the stools firm and infrequent; the sleep refreshing; appetite and digestion good; the mind rather inclined to gaiety than seriousness, and not easily disturbed by emotions." (p. 104.)

We have some excellent dietetic rules in this chapter. Old people ought to take food in small quantities, and never to repletion; for large quantities are not fully digested, and partly pass through the alimentary canal unchanged. A full stomach presses dangerously on the thoracic viscera and the larger blood-vessels. After eating, active exercise, whether of mind or body, should be avoided; and a *siesta* is generally recommended. Should, however, the face become red during sleep, and the individual awake with vertigo and a dull headach, it is better to avoid it. Milk is an excellent article of diet; well-fermented malt liquor may be taken, and also good old wines free from acidity and astringent matter. Old hocks or French wines and Alicant, Madeira, or Malaga, are the best. Tea and coffee in moderation are also suitable.

The temperature of the atmosphere has an important influence on the mortality of old people. Statistic researches have verified the dictum of Celsus, "Senes æstate et autumni primâ parte tutissimi." The following tables exhibit the fact:

*Part of a Table from Quetelet.**

Ages.	Jan.	Feb.	Mar.	April	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
50 to 65	1·30	1·22	1·11	1·02	0·93	0·85	0·77	0·85	0·89	0·90	1·00	1·15
65 to 75	1·43	1·32	1·18	0·99	0·91	0·77	0·71	0·80	0·85	0·86	0·98	1·17
75 to 90	1·47	1·39	1·16	1·01	0·87	0·77	0·67	0·75	0·84	0·84	1·00	1·21
90 and upwards ...	1·58	1·48	1·25	0·96	0·87	0·75	0·64	0·66	0·76	0·74	1·03	1·29

Deaths at Troyes for ten years; 1821-30.†

Old people, at all ages ...	0·83	0·74	0·76	0·76	0·54	0·47	0·39	0·39	0·40	0·42	0·62	0·63

Looking at these tables, the practitioner, we think, will not hesitate to recommend a warmer climate to his aged patients during the winter

* This comprises about 400,000 of different ages, and applies to all Belgium for the years 1827 to 1831.

† Patier, Lancette Franç. 1835, No. 107.

months, if circumstances permit; and if not, will take care to show the importance of a regulated temperature. Old people, we think, should never sleep in a room without a fire if the temperature be at or below 45° to 50° Fahr. The more provident amongst the ancient Romans betook themselves to Naples when they found old age creeping upon them.

Elderly people commit a grievous error when they utterly abandon their customary pursuits, and often with those their usual exercise of body and mind. Nothing is so injurious to health as this stagnant *otium cum dignitate.* It often lays the foundation both of bad habits and of bad health, and those lead to premature death, especially from apoplexy. But anxious cares are as injurious as idleness. Easy circumstances and placid pursuits promote longevity. When a man insures a sum of money on his life or an annuity, he so far removes a fertile source of mental anxiety and bodily disease, and proportionally assists his digestive and assimilative powers. He has, in fact, insured an addition of years. With a similar object in view there should be a gradual withdrawal from the cares of business, only retaining so much of the latter as will afford a healthful excitement. Our author recommends the society of children in walking, conversation, play, &c., as particularly suitable to the aged. Nature herself, in the penchant which decrepitude exhibits for infantile life, points to this.

Dr. Canstatt, in his fifth chapter, lays down general principles regarding the treatment of senile diseases, some of which we will notice. It is important to remember that old age is itself a state of disease. The actual standard of health is below par, and the efforts of the physician are injurious when directed to the attainment of anything beyond the maintenance of this state. The *vis medicatrix naturæ* has less scope for action than in youth, and the vital powers oscillate between health and death in much more circumscribed limits. The treatment, therefore, should be the more carefully expectant, and the less actively medicinal. Medicines also vary in effect as age advances. Salines are less suitable to the aged than the young and robust; nitre, our author thinks, should rarely or never be given, as it acts directly and injuriously upon the digestive organs of old people, inducing a kind of paralysis. The metallic remedies require to be carefully administered; arsenic is dangerous; iodine and mercury readily induce marasmus; even iron is not always safe; but zinc and antimony are indispensable. Quinine is the iron of the aged. The balsams and gums are the most generally applicable to senile diseases. In all blenorrheal affections, in nervous disorders of the thoracic and abdominal nervous systems, and in infarction of the portal system, they are particularly useful.

The approaches of disease are generally insidious in old people. Common sensation is often so dull, that the usual warnings of pain or uneasiness are not given, and impending death first excites the suspicion of disease. This insidious approach is frequently observed in the pneumonia of the aged. Partial anæsthesia of the vagus is present, increasing *pari passu* with the inflammation, and there is little or no *feeling* of dyspnea, or much febrile reaction, even when pulmonary disorganization is far advanced. Hence the necessity of numbering the motions of the thorax in all cases of slightly increased cough of old people, and especially in cold or changeable weather. For a similar reason, the pre-

monitory signs of apoplexy, of softening of the brain, of glaucoma, and of atrophy of the alimentary canal, seldom attract due attention.

Acute diseases in old people rarely terminate by perfect or sudden crises. The excreting organs are usually impaired in both structure and function, especially the skin and kidneys. The *lysis* or solution of a disease in this mode is often slow, and more or less incomplete; and the strength of the patient is only weakened by attempts to accelerate it. It is of more importance to ascertain the relations of present disease to past pathological changes. The physician, if not acquainted with these, should extract from the patient a pathological history of his life; and thus not only a knowledge of his idiosyncrasy or constitution would be acquired, but the physician would also learn whether the symptoms were those of a primary or secondary affection, the seeds of which were sown in earlier years. The effects of residence in a tropical climate are sometimes shown for the first time in advanced years. The peculiarities, habits, and pursuits of the patient during his past life are also important to be known in all their details. An intermittent pulse is often the normal state in old persons. A regular pulse in such indicates febrile action. Dr. Canstatt writes strongly against the "inflammation-fanaticism" (as he terms it), and its influence upon the well-being of the aged. The horrid depletion practised by those physicians whose minds are impregnated with it might well make the judicious and thoughtful physician shudder. Topical bleedings are most effectual, especially if a tonic general treatment be combined. Venesection is by no means a safe operation when performed on the aged; it has been followed by immediate death; indeed Dr. Canstatt advises that the patient take a mouthful of good wine before the vein is opened.

Our author has a chapter headed with the motto "Senes bis pueri," in which an analogy is made out between the diseases of old age and infancy. Its contents are of no practical value. We express the same opinion respecting the first chapter of the second part, in which the normal conditions of lower animals is traced through the retrocedent development of old age. The arcus senilis is thus shown to be an approach to the bony rings of the sclerotica in birds; the skin, dry and scaly, resembles that of many animals, as the pachyderms; the contracted stomach of the aged is analogous to the stomach of reptiles and insects and so on, to the end of the chapter. It is impossible to divine the utility of all this; we suppose, since Dr. Canstatt says it is of little practical value, that the chapter is written exclusively for the German intellectual market. The remaining seventeen chapters are devoted to a general consideration of the pathology and therapeutics of senile diseases. The whole presents a compact view of the latter, but we must refer the reader to the work itself for details. We give the following extract as an example. It is our author's description of the phenomena of inflammation in aged people, termed by Autenrieth *neuroparalytic*, by Schönlein *neurophlogistic:*

"*a*. The volume of the inflamed organ is increased, and its absolute weight augmented; whether its density and specific gravity be increased also is doubtful.

"*b*. The large vessels, particularly the veins near the inflamed organ and in its parenchyma, are dilated and filled with dark blood. This thick congeries of vessels abounding with dark often blueish blood, is particularly distinct in arthritic ophthalmia.

"*c.* The redness of the inflamed organ is dark, violet, or almost like a cherry brown, and of a dirty hue; it is not so equally diffused as in younger subjects, but more dispersed, radiated, or punctated. The vascular tissue is not so thick, and the overfilled vessels are more distant and isolated.

"*d.* In inflammation of old people the affected tissue is softened, friable, pulpy, and easily torn with the finger.

"*e.* Transparent structures become opaque, even with a slight degree of inflammation. . . . .

"*f.* The products of inflammation are frequently found after death, as mucus in the bronchi after bronchitis; water in the serous ones, hepatization of the lungs, &c.

"*g.* The arterial system has much less share in the inflammatory action than in young persons, and new vessels are formed in the inflamed structure with much less facility. The *zoogen* is more unpliant and impenetrable. . . . .

"*h.* Consequently the retardation of the venous circulation in the inflamed structure is remarkable; this constitutes the main characteristic of inflammation in old age. They deserve, *κατ' εξοχην*, the name of venous inflammation." . . .

"*k.* With respect to the heat of inflamed parts, either it is small in amount or is prickly and unpleasant. The more distant parts are often cold; in the inflamed parts themselves the patient experiences an intolerable heat.

"*l.* The *turgor vitalis* is generally diminished, and even in the inflamed structures is not increased.

"*m.* The functions of the inflamed organ are half paralysed, especially where nervous influence is necessary to their performance. If a secreting organ be inflamed, as, for example, the pulmonary mucous membrane, the mucous secretion itself is increased, but the bronchi themselves are half paralysed, and are only partially capable of expelling the increased mucus. The same occurs in inflammation of the bladder. Since the sensibility of old persons is obtunded, their inflammatory affections are seldom accompanied by the severe pain observed in young patients, but are the more dangerous and mischievous on this account, because pain is the sentinel of health, and its intensity affords a measure of the intensity of inflammation. . . . .

"*n.* As a consequence of this sub-paralytic state, the symptoms of inflammation are often intermittent in old people. Their nervous irritability requires longer intervals to recover itself. This intermission or remission of the symptoms of reaction is no proof of a less degree of disease, but rather a forerunner of complete paralysis. Consequently, senile inflammatory diseases are distinguished by a tendency to paralysis, or by terminations which are the results of paralysis. Sometimes they consist solely in paralysis, or in paralysis of the nerves and vessels conjoined, (gangrene, softening, paralytic effusions.)

"*o.* The general health is affected at a much earlier period in the inflammatory affections of the aged than in those of the young. The prostration of strength is remarkable, the patient feels singularly week and feeble." (pp. 197-200.)

In senile hectic fever, Dr. Canstatt recommends the following as particularly useful: Phosphorus, gr. iv, sulphuric naphtha ʒj; Mix; ten drops to be taken every two hours in a little water. The extr. Cardui Benedicti is almost a specific (he states) in chronic catarrh complicated with debility of the digestive organs.

In the sixteenth chapter, Dr. Canstatt treats of scrofula, gout, infarctions, lithiasis, and ossification, as being closely related, especially gout and scrofula, and gout and lithiasis. There are several interesting points developed in this chapter, but as we could only discuss them critically, and for this have no space, we pass on to other matters. The whole chapter, whether considered theoretically or practically, is worthy a careful perusal.

The second volume is devoted solely to the special pathology and treat-

ment of the diseases of the involution-period. They are arranged under five heads as they affect the brain, thoracic viscera, abdominal viscera, genito-urinary organs, and cutaneous structures. Some of these we shall notice.

Hyperemia of the brain. This affection deserves special attention, because it is generally the precursor of other and more serious diseases of the encephalon. It is usually connected with partial obliteration of the capillaries, ossification of the larger arterial trunks, and varicose dilatation of the veins, and with obstruction in the return of the blood to the heart. The imperfectly oxygenized carbonaceous blood itself is a cause also of congestion. Vertigo, stupor, sleeplessness, and a predisposition to a soporose state, result from these causes, and at last end in apoplexy, softening of the brain, and dyscrasic inflammation, giving rise to paralysis.

Hyperemia may also take place solely as the result of the physical law of gravity. If aged people lie long in the same position, the slowly circulating blood sinks to the most dependent point, and accumulates in the cerebellum, and sopor, paralysis, &c. follow; just as hydrostatic pneumonia is developed in aged individuals who lie long on the back; and hence the practical maxim never to allow persons of this kind to rest long in the same position, especially in long-protracted diseases.

"*Cerebral hyperemia* is not always characterized by distinct symptoms. It may occur in a slight degree, and during relatively good health. Persons so affected complain of headach, dizziness, dulness, and stupor, or wakefulness; they feel weak, indolent in spite of themselves, and have a heaviness in their limbs. The pulse is sometimes full and tense, the face frequently red, particularly after lying down, or during sleep, or on awaking from sleep; the jugular veins are turgid and undulate; the venous network of the face is dilated and full; even the veins of the conjunctiva are varicose and prominent. Formication and titillation of the extremities are soon added to these symptoms. They often disappear entirely for a time, and then return again in all their intensity, especially after eating to repletion, or after muscular efforts, straining at stool, &c. Apoplectic attacks, with or without sanguineous effusion, may suddenly supervene; or even paralysis, for which no other cause may be found after death than simple hyperemia. The symptoms may differ according as one or other part of the brain is hyperemious." (Vol. ii, p. 3.)

Hyperemia of the brain, as Dr. Canstatt truly remarks, is rather a morbid predisposition than a specific disease. It is usually observed in the plethoric, with abdominal turgescence. On the other hand, individuals predisposed to softening of the brain are weak, have a cachectic bloodless look, and a small pulse. If individuals of the former constitution complain of flashes before the eyes, noises in the ears, difficulty in swallowing or speaking, stiffness and contraction of the muscles of the neck, restlessness during sleep, &c., in addition to the other symptoms of hyperemia, an apoplectic attack will quickly follow unless immediate relief be afforded.

The treatment of hyperemia must have direct reference to its causes. Sometimes, however, these are not apparent, and very often the highest diagnostic skill can scarcely decide whether the symptoms complained of are those of active hyperemia or of debility. If plainly of the former, venesection is necessary; if doubtful, a tentative treatment should be

adopted; laxatives and gentle diuretics, with leeches to the anus or cupping of the back and neck.

We need not follow Dr. Canstatt through his notice of vertigo, coma, agrypnia, and syncope, considered as distinct diseases. They often depend upon the same causes as hyperemia, or on others well known, doubtless, to our readers. Agrypnia is sometimes an urgent symptom, as the patient becomes much debilitated by want of sleep. It sometimes depends upon dietetic errors with regard to time, or quality, or quantity. These should be pointed out. Musk is useful in cases dependent upon psychical irritation; opium is dangerous; hyoscyamus is better, or lactucarium (from gr. j to gr. ij); belladonna is recommended by Jahn; but this we should think quite as dangerous as opium. A pillow stuffed with hops has been found useful.

Syncope in old people, Dr. Canstatt thinks, is undoubtedly of cerebral origin, and always a serious symptom. In its highest degree it borders on the so-called nervous apoplexy. Our own experience would lead us to say that syncope is rare in old people, except as premonitory of paroxysmal diseases. When a symptom of disease of the heart follows uterine hemorrhages, it is of course an important one.

Cerebral apoplexy. This disease is treated of at great length and with much minuteness of detail. Dr. Canstatt presents a very complete view of the affection in all its forms. He divides it into three stages, 1, of congestion, or molimen hæmorrhagicum; 2, of paralysis; 3, of reaction or resolution. The symptoms of the first stage are mainly those of hyperemia already detailed. These may continue for months or years, and present oscillations in intensity, for the most part dependent, Dr. Canstatt thinks, on variation in atmospheric density and pressure. Sometimes attacks of simple congestive apoplexy will precede the more serious attack consequent on sanguineous effusion. The former is the *coup de sang* of the French, and is known from the latter principally by this, that all the extremities are usually affected. There may be hemiplegia or partial paralysis, however, as happens to those epileptics who remain hemiplegic for a day or two after a succession of fits. This form may be periodic. Rüsch relates an instance in which an individual, aged sixty-five, experienced seven paroxysms at intervals of one month between each, without suffering any bad consequences. (Mediz. Annalen, Bd. i, Heft 3.)

The second stage of apoplexy is that which gives the name to the disease, constituting emphatically "the fit." The third stage commences with a return of sensation and motion to the parts which had lost them; this return being dependent upon the reactive energy of the brain itself, and not on the absorption of the extravasated blood. This reaction is displayed in the lower extremities sooner than in the upper, and power returns in the tongue and muscles of the face before it is felt either in the arm or leg. Sometimes there are reflex movements; the muscles of the leg or the side of the face affected being convulsed without consciousness. Sooner or later vascular reaction comes on, and there are febrile exacerbations, flushings of the face, headach, and occasionally epistaxis; the pulse rises, the skin is hotter, the urine high coloured. Chronic paralysis is the termination of this stage.

Dr. Canstatt devotes considerable space to the diagnosis of apoplexy. He classes the symptoms as they are connected with the motive, sensitive, sensual, and intellectual powers. Apoplectic paralysis of the face is distinguished from rheumatic paralysis, and from that dependent on granular softening or on nervous apoplexy, or on serous apoplexy (hydrocephalus) or on disease of the spinal cord. The pathological anatomy of apoplexy has been so often and so well described, that Dr. Canstatt could scarcely add much to it. It appears, however, from Fuchs' researches,* that the softening of the brain usually found round the clot is characterized by peculiar symptoms during life. Where softening follows effusion, the pulse becomes small, weak, quick, and irregular; the consciousness after the first attack is imperfect, a comatose state is induced, and another fit follows, although there is no fresh effusion. The patient usually dies of a slow fever. Fuchs found this secondary softening in almost all cases of apoplexy in which the patient died in four, seven, or ten days without suffering a fresh attack.

Apoplexy is the disease most fatal to persons in the decline of life. Walther, however, places the number too high when he asserts that nine out of ten die of apoplexy. Rochoux states that of 69 cases of apoplexy, 49 occurred in persons aged from fifty to eighty, and 37, or more than one half, in those from fifty to seventy years of age. Men are more subject to it than women. Of 2297 cases collected by Falret, 1670 were men. According to P. Frank, 637 men and 604 women died of apoplexy in the hospital at Vienna, between the years 1784 and 1804.

Dr. Canstatt thinks too much stress has been laid on the connexion between apoplexy and cardiac diseases. The changes in the vascular system which predispose to the latter, predispose also to the former; the two diseases are rather coincident than casual. The gouty constitution predisposes. "Arthritis quæ quibusdam calculosam," says Stoll, "aliis vero apoplecticam dispositionem inducit." Atheromatous disease of arteries is an usual concomitant of gout, and gouty inflammation of the meninges may readily induce congestion and rupture of these brittle atheromatous vessels. Atmospheric changes so constantly induce apoplexy, that the disease has been observed to be epidemic, as stated by Baglivi and others. Hippocrates observed that cases were more frequent in winter, and Andral's statement, that of 177 cases, 60 were in winter, 42 in spring, 35 in summer, and 40 in autumn, confirms the observation. The secular divisions of the seasons is unsuitable to medical statistics. The vernal equinox is not physiologically the commencement of spring, but the middle; as the winter solstice is the middle and not the commencement of winter.

Falret attempted to show that certain epochs are more favorable than others to apoplexy, as follows. In the ten years

From 1794 to 1804 there were	339 cases.
From 1804 to 1814	997 ...
From 1814 to 1824	919 ...
	2255

Very little reliance can be placed on statistics of this kind, for obvious reasons.

* Beobach. und Bemarkung. über Gehirnerweichung.—Leipzic, 1838.

Our author next presents us with a good view of the treatment of apoplexy, but little that is new to the English reader. He recommends bleeding at the equinoxes to those predisposed to the disease. Bleeding from the arm is in all cases preferable to section of the jugular vein.

Encephalomalacia senilis, or softening of the brain, in old age. A very complete history of this affection is given; its course, complications, diagnosis, and pathological anatomy being systematically described, and reference continually made to the most recent authors on the subject, particularly to the work of Fuchs before quoted. This disease we have reviewed very recently.

Meningitis, acute and chronic hydrocephalus, atrophy or senile cretinism, and the pseudoplasmata of the brain, are considered in succession. Under the last head are included tubercular and cancerous degenerations, aneurisms, and hydatid and other tumours, as they affect the aged.

Pneumonia senilis. This is the first disease treated of in the second division. It occurs in two forms: in the one its attack is sudden, and its symptoms unmistakeable; the other proceeds more slowly and mischievously, and often the true nature of the disease is so concealed that the patient appears quite well, attends to his usual business, goes about, and eats with appetite, until at last he feels exhausted, and dies quite unexpectedly. Not unfrequently in such cases a large portion of the lungs is found after death in a state of suppuration. The following is our author's description:

"When attacked with pneumonia, old persons rarely complain of dyspnea. The breathing is nevertheless frequent and difficult, the chest is more energetically moved than usual; the patient lies motionless on his back, and is unable to turn on his side; he speaks with difficulty, and coughs between almost every word. The physician should never neglect to count the number of respirations in those old persons who complain of slight oppression or stuffing of the chest. The pneumonia of old people is also rarely accompanied by pain; nothing more is commonly complained of than an indistinct uneasiness which seldom becomes fixed. The patient is often deceived as to the seat of pain, and refers it to a part of the lungs quite free from inflammation. The absence of pain must not lead the physician to suppose that the inflammatory action is slight, for even when a large part of the pleura is inflamed, the pleuritic stitch is often wanting. Pneumonia in old subjects often begins with arthritic symptoms, and the characteristic signs of the disease appear only after venesection. There is generally a cough, but it is so slight as not to be noticed by the patient. In many cases it does not differ from the cough of bronchitis; but it generally consists in one or more little convulsive *puffs* without antecedent inspirations; it may, however, be exceedingly troublesome. It is sometimes a rattling, sometimes a gurgling cough. Where there is no blood in the sputa, they are grayish or greenish, and opaque, seldom transparent and tenacious; at an advanced age they are puriform. They are, however, more or less tinged with blood, and are sometimes almost altogether sanguineous; at a later period this goes off, and the sputa are like chocolate or plum-sauce. An habitual bronchorrhea sometimes modifies the sputa of pneumonia, and sometimes in those old patients who have been addicted to spirit drinking, the breath has a disagreeable putrescent smell, even when there are otherwise no suspicious symptoms. The physician will therefore be careful not to infer from this symptom that there is gangrene of the lungs." (pp. 93-4.)

This odour, we would observe, is not gangrenous but fecal. No physician who has observed cases of this kind can mistake the one for the other. The fecal odour is by no means confined to old people, nor to

pneumonia; it is rather an accompaniment of some curious forms of bronchitis.

On noticing the physical signs, Dr. Canstatt describes the modification induced in them by the physiological peculiarity of the aged. The chest generally is more sonorous, but at the inner half of the clavicular region is often less resonant on account of the black or gray induration so common in the apices of the lungs of old people, and in old females by the peculiar bowing of the clavicles. The respiratory murmur is more vesicular and clearer, and resembles rather the murmur of bronchial respiration.

Delirium is commonly one of the rational signs of pneumonia, and the patient complains more frequently of pain in the head than in the chest. The face is red and often livid or earth-coloured. The nostrils are dry, the tongue dry, white, crumpled up, and often dark and covered with a sooty fur. Other symptoms are enumerated, and it is finally stated and truly, (as we ourselves know,) that all the characteristic symptoms may be absent when the disease is intense. This form is most frequently seen in persons with structural disease of the heart.

Pneumonia is an acute disease in the aged. Hourmann and Dechambre found the average duration in 33 cured cases to be 14 days; in 76 it was fatal in 7 days.

Treatment of pneumonia. If the inflammation be peracute, bleeding should not be neglected, however old the patent may be. Octogenarians will often bear it well. The pulse is, however, no criterion for the operation or for its repetition; spare old men bear it better than corpulent subjects in most cases. Local bleedings had better follow the general.

If the hepatization has passed into suppuration, bleeding is dangerous, expectoration is prevented by the debility induced, and the patient may die suffocated a few hours after.

As to the medicines, Dr. Canstatt recommends us to administer sal ammoniac, (the hydro-chlorate of ammonia,) in preference to nitre. It diminishes vascular action, and assists expectoration without debilitating. Large doses of tartar emetic may be useful in young people, but are dangerous in the old, inducing colliquative diarrhea and general prostration. The white oxide of antimony in large doses, as recommended by Recamier is better. Senega and squills are useful when the expectoration is stopped, or the strength failing. Flowers of benzoin, (a good old remedy,) were formerly given in such cases, gr. ij to iv, every two hours. Narcotics are of doubtful utility, and diffusible stimulants should only be administered in cases of prostration.

The remaining diseases of the lungs treated of are, bronchitis, chronic pulmonary blenorrhea, moist asthma or dilatation of the bronchi, chronic croup in the aged, asthma in all its forms, hydrothorax, phthisis, hemoptoë and pulmonary lithiasis. Our crowded volume will not permit us to notice in detail either these or the other affections of the heart, abdominal viscera and external surface. The student of German literature will do well to peruse the work for himself. There are some forms of disease, however, dependent, according to our author, upon the gouty diathesis or upon imperfect urinary secretion, which we will glance at, as we think his views will interest many of our readers.

We have already remarked on the connexion between gout and apo-

plexy. Arthritic tubercular disease may be developed in the brain. In these cases, paroxysms of cephalæa resembling clavus, take the place of the regular fit, and the pain, gradually increasing, may become so intense as to deprive the patient of sleep and rest. If the disease continues, structural changes take place, and periodical epilepsy or convulsions follow. These, in their turn, may exhibit the type of arthritis, or may be more severe at the periods when gouty paroxysm usually come on. They are generally unaccompanied by an aura, and are most frequently hemiplegic, and terminate either in apoplexy, paralysis, or idiocy.

Chronic coughs are often gouty. In these cases the paroxysms of coughing come on most frequently about midnight, or two o'clock in the morning. Occasionally, a bronchitic affection alternates with fits of the gout. *Asthmatic* affections are often complicated with the latter. Three species of asthma are specified by our author, which we think are so closely allied as to constitute only varieties of the same disease. These are asthma *urinosum*, *arthriticum*, and *gonorrhoicum*. The last mentioned is named by Schönlein, and described as follows: Long after the suppression of a gonorrheal discharge, (say, from 15 to 20 years!) slight oppression of the chest, and dyspnea are felt, especially after any exertion, which at first soon disappear, and are scarcely noticed by the patient until after some exciting cause, as, for instance, excess of wine, or strong emotion, a perfect asthmatic paroxysm comes on. The cough is at first dry, but subsequently blood and masses of coagulable lymph, varying in size from that of a hazel-nut to an apple, are expectorated, or thrown off by vomiting. Unless this takes place the patient dies during the fit, suffocated. *Arthritic* asthma appears in gouty patients, and the paroxysm is preceded by the premonitory signs of a fit of gout, as uneasiness in the precordial region, flatulence, acid eructations, cramps of the legs, loaded urine, &c.; but instead of the usual fit, a paroxysm of asthma comes on about midnight, and is distinguished from others by the great irritation of the pulmonary mucous membrane. In consequence of this the countenance is remarkably livid, the jugular veins distended, bloody foam comes from the mouth, and towards morning, when the fit is remitting, large masses of mucus mixed with blood are vomited or expectorated. The paroxysms, as to their duration, return, and critical terminations, correspond in all points to paroxysms of gout. The *asthma urinosum* closely resembles the arthritic as to its mode of attack and termination; but there are some other general symptoms peculiar to it which we shall subsequently notice, and the expectoration is more glairy, tenacious, and has often a saline taste and urinous odour. Both these forms of asthma readily pass into apoplexy.

The treatment of these affections is not very diverse. The asthma gonorrhoicum, we believe to be an imaginary disease so far as regards its cause; the affection described under that name being a variety of the arthritic or urinous form; it is best treated by emetics. In arthritic asthma, the symptoms are so urgent that, besides the general treatment, bleeding to eight or twelve ounces is almost indispensable to prevent suffocation. Musk is also of the greatest use as a palliative. In the urinous asthma, bleeding is rarely necessary; diuretics should be administered, but very carefully as renal disease is often coexistent, and the irritation of the kidneys may readily pass into inflammation.

Arthritic hydrothorax is usually developed between the ages of forty-five and sixty. Men of strong constitutions, and great eaters whose assimilative powers are weakened by a sedentary life or mental labour, are most usually the subjects of it. It is sometimes acute, and then is the consequence of retrocedent gout. When it is chronic, the pectoral symptoms are preceded by the visceral derangements usually premonitory of a gouty fit, but instead of pain in an extremity, dyspnea, palpitation, intermittent pulse, &c., suddenly come on. In a while, these become less intense, but do not altogether disappear, and are periodically aggravated. Structural disease of the heart and large vessels is the consequence of these attacks. It is doubtless in cases of this kind, (although the opinion is not noticed by our author,) that a solution of the disease has been observed to follow on some critical profluvium, as profuse sweats, and urinary discharge. We should also be inclined to class the *intermittent phthisis* of the involution-period, particularly of its commencement, with these affections. This thoracic affection is apparently dependent upon peculiar ulcers of the legs, which we shall notice presently; as these heal or discharge less, the pectoral symptoms appear. The latter occur specially in autumn, and are accompanied by symptoms of fever; but the bowels are confined, the urine scanty, dark, saturated with saline matters, and throwing down a copious precipitate. It appears to us that the disease is really a constitutional peripneumonia ending in suppuration, and that the ulcers only act as outlets for the materies morbi, and are analogous to issues. At all events we have witnessed cases of pulmonary diseases in elderly people of decided gouty constitution which were manifestly of this kind. The pulmonary affections connected with hemorrhoids or fistulæ ani are also allied to this. The *lithiasis pulmonum* is usually of gouty origin, and analogous to the lithiasis of the arteries. The concretions are deposited in the serous or subserous cellular tissue of the bronchial ramifications, or of filled-up tubercular cavities, and constitute a sort of imperfect ossification. They may attain a considerable size, and are composed of the phosphate and carbonate of lime, phosphate of magnesia, some cholesterine, oxide of iron, and silica.

Structural changes and diseases of the heart and its appendages in old people, are eminently connected with the gouty or rheumatic constitution. At first, they often alternate with imperfect fits of the gout, until the latter entirely disappear. The connexion between the gout and the renal secretion is also manifest in these cases; the structural change in the heart, says our author, scarcely manifests any of its peculiar symptoms so long as the kidneys perform their function properly. The more scanty and imperfect the urinary secretion, the more urgent the symptoms of cardiac disease.

We need not go through the individual symptoms of cardiac disease which are dependent on arthritic metastasis. Of course, there may be gouty palpitations, carditis in all its forms, cardiostenosis, or valvular disease, angina pectoris, &c., and these may be either acute, peracute, or chronic. One or other of these arthritic cardiac affections is so frequently observed in old people that Frank pronounced the gouty diathesis to be a *senectus anticipata*. As regards the renal function, this is highly probable.

Arthritic affection of the stomach. It is the humoral pathology that illuminates most clearly the diseases of old age, although so con-

stantly connected with structural change. Impaired function of an important excretory organ, as the kidneys, is necessarily followed by impaired functions in other organs. The matter which ought to have been eliminated, becomes a true *materies morbi*, circulated as a foreign body through the system, and is deposited abnormally on structures otherwise healthy. The kidneys have both an anatomical and a physiological connexion with the testes, and it is more than probable that the impaired function of the former organs is closely connected with the impaired function or morbid reaction of the latter. Be this as it may, the materies morbi which determines arthritic metastasis operates when located on the stomach as a most active and dangerous poison. We know of no disease more painful, and requiring more anxious care and prompt treatment than the arthritic gastritis of old men, or gout in the stomach as it is popularly termed. In all cases of this kind, the practitioner must establish a decided diagnosis at once, and unflinchingly act upon it. Delay is emphatically dangerous here, as disorganization and perforation of the stomach very quickly succeed to the arthritic inflammation. Large doses of morphia and diffusible stimulants are the most effectual remedies at the outset, combined with derivatives to the extremities. When, however, the inflammation is established, and all remedies are immediately rejected, we have found great benefit from a very copious enema, (say a gallon,) of warm water with from half an ounce to an ounce of sulphuric ether, and three or four drachms of laudanum. The cæcum, and the ureters and the urinary bladder, but especially the cæcum, are also the seat of this arthritic inflammation, a fact not noticed by Dr. Canstatt.

Ascites venosus s. periodicus. We extract Dr. Canstatt's description of this affection entire:

"This disease attacks only old persons, sixty and seventy years old, who at an earlier age suffered from regular or irregular gout, hemorrhoidal congestions, or hemorrhoids. Although these pathological excretions have ceased, their existence in the system is still manifested in cold, damp weather by venous turgescence in general, and particularly of the portal system, by oppression in the hypochondria and hypogastrium, and tension of those regions; by fulness and undulation of the external veins, as for example, those of the neck and of the hemorrhoidal veins. There is, however, no hemorrhoidal discharge; the general reaction by which the *materies morbi* was formerly eliminated is wanting, and, falling short of this, excites only febrile irritation, with some degree of cutaneous itching and efflorescence, which disappear after a sweat. The venous congestion and the want of reaction is followed by external and internal effusion and dropsical swelling. The surface becomes œdematous, and, what is remarkable, the higher parts first, namely, the genitals, nates, loins, and hips: from these the œdema descends to the legs. The patient passes a small quantity of urine, the colour of brick-dust, and throwing down a precipitate a finger thick, containing uric, purpuric, and erythric acids; and now the abdomen enlarges. In the beginning the œdema is not permanent, but continues a few days and then disappears, the patient passing more urine and perspiring; ultimately, however, it becomes permanent.

"In the commencement of the affection these symptoms continue as long as the hemorrhoidal or gouty paroxysm formerly continued, namely, from one to four weeks, and terminates with a critical sweat, or a copious urinous deposit; the abdomen then collapses, and the patient remains free from the disease until some particular influence—the seasonal changes or the accumulation of *materies morbi* —excites a fresh paroxysm. It is on this account that the disease has been termed *ascites periodicus.*

"This form of abdominal dropsies is an anomalous form of gout, developed

partly in consequence of senile debility, partly by debilitating external influences. . . . . .

Anomalous arthritis sometimes alternates with venous ascites, sometimes with arthritic hydrothorax and asthma. This wandering form is the more dangerous, as it quickly gives rise to those structural changes in the heart and lungs which of necessity end fatally." (pp. 317-18.)

Dr. Canstatt recommends leeches to the anus, hypochondrium, and hypogastrium, and cupping along the spine. Small doses of chelidonia and aloes may excite a hemorrhoidal flux. To remove the effusion, cathartics should be administered two or three times a week in conjunction with diuretics and diaphoretics. In the arthritic form, the drastic purges are dangerous. The kidneys and skin should be acted on rather than the bowels. Sulphureous preparations, Dover's powder, acetate of soda, aconitum, rhododendron, guaiacum, and tincture of nicotiana topically are the remedies recommended. We pass over the arthritic affections of the kidneys, bladder, and ureters, to a form of general disease occurring now and then in aged persons, termed by our author and other German writers,—

Anuria seu Urodialysis senum. This affection has been illustrated and considered systematically by Autenrieth, Schönlein, and Jahn. It consists in an almost total suppression of urine, not occurring suddenly but gradually, so that the system, in becoming charged with the urinary secretion, becomes also accustomed in some degree to its presence, and an imperfectly vicarious excretion takes place from different organs. The skin is dry, the urine small in quantity and scalding, and there is frequent micturition. The digestive organs are deranged, the tongue covered with a white fur, and the rest broken by the frequent calls to pass urine. Urodialysis assumes various forms.

"*a.* It sometimes appears as *rheumatismus urinosus*. The patient complains of irritating pain in the limbs, exacerbated at night. For the most part they follow the course of the sciatic nerve and are periodic.

"*b.* The skin is most frequently the seat of urodialytic irritations.

"Sometimes it appears as an intolerable itching, aggravated at night, and depriving the patient of sleep. The skin is often rough or covered with a chronic eruption in the form of papulæ or clusters of small vesicles, from which, however, the head and face are free. The patient scratches the heads off these and they are then covered with a small bloody scab forming *prurigo* and *epinyctis senilis.* Sometimes these vesicles are larger and belong to the pemphigus class. As regards the face, *herpes exedens* may attack the lips, cheeks, and eyelids; it begins with a hard, livid, little knot, which, when scratched off, leaves a small jagged ulcer that secretes a thin ichor, is covered with a crust, and continually gets deeper and deeper. Sometimes there is cancer of the tongue.

"As regards the lower extremities, the urodialytic irritation gives origin to the formation of chronic ulcers, the so-called "salt fluxes;" these are commonly situate on the anterior and inner surface of the leg, and are first made by a scratch or slight injury to the skin. They are painful, readily extend, are flat, have hard but not raised edges, and secrete an acid, acrimonious thin ichor, very nauseous and sometimes of a urinous smell, which when inspissated on the ulcer, forms a thin black crust.

"*c.* The conjunctiva is also sometimes the seat of an irritating discharge; it becomes red, relaxed, and pours out an acrid mucus which corrodes the eyelids, changes the adjoining cutaneous structures into mucous structures, destroys the eyelashes and commissures of the eyelids, renders the lucid cornea opaque, excoriates the cheeks, and brings on ectropria, trichiasis, and nebulæ. This affection is known as *lippitudo senilis.*

"*d.* Urodialysis may excite numerous forms of disease in the thoracic viscera. Many of these patients suffer from constant dyspnea, short and anxious breathing, and palpitation.

"The *asthma urinosum* has been already described. Urinary acrimonies also excite those forms of chronic pneumonia and periodical phthisis previously alluded to. Hydrothorax often quickly follows either on the asthmatic affection or on obstruction of the discharge from the urinary ulcers in the extremities.

"*e.* As regards the brain, apoplexy is the sequel. The patient complains of vertigo, headach, heaviness and dulness in the head. An acute burning sensation in the nucha and occiput is a certain premonitory sign of urinous apoplexy. A subacute typhoid state may also be developed, with stupor, coma, passive delirium, and putrid scorbutic symptoms." (pp. 385-7.)

Of course several of these forms of disease may appear simultaneously; prurigo, for example, usually accompanies urinous asthma. Death results either from apoplexy or thoracic disease, or the patient is worn out by the intolerable itching. The sufferers are almost invariably above sixty, and principally in the lower classes of society. In fact it is usually a disease of decrepitude and cutaneous uncleanness.

The remaining arthritic disease of old age are in the fifth division of Dr. Canstatt's work. Of these *prurigo vulvæ* and *prurigo podicis*, as well as prurigo generally, are allied to urodialytic prurigo. It must be observed, however, that in arthritic prurigo, the irritation most usually attacks those portions of the surface connected specially with the genito-urinary system, as the chest, shoulders, axillæ, and the genital organs; the inner surface of the vagina, according to our observations, is as frequently the seat of prurigo as the outer. *Gangrena senilis* is sometimes distinctly connected with anomalous arthritic affections. Morgagni quotes three remarkable cases of this kind, in which the cure of gangrenous ulcerations of the heel were preceded by profuse critical discharge of urine, and death resulted from inflammation of the bladder.

Erysipelas senile. This is an affection the practitioner should thoroughly understand, as it differs altogether from the common erysipelas of surgical writers, as well in its course and causes as its treatment; it is in fact cutaneous gout. This erysipelas is usually seated in the lower extremities, although it may be erratic, that is to say, migrate to other parts, just as arthritic affections in elderly people will. There is usually a livid red spot first seen on the anterior surface of the tibia more or less circumscribed, and which usually disappears on pressure. The general symptoms are those of the arthritic or hemorrhoidal diathesis; as tension of the epigastric or hypochondriac regions, constipation, anorexia, bitter taste in the mouth, headach. Indeed, in many cases there are first regular fits of gout, then hemorrhoidal discharges; afterwards these become irregular and anomalous, and then there are periodic attacks of the erisipelas. There are very rarely vesicles in this form of erysipelas not even when gangrene comes on, but the affected limb is often œdematous, and the veins varicose.

This erysipelatous inflammation, like the gouty, is of a critical kind; it is a sign that the blood is undergoing a purifying process, and cannot be repelled without danger. It exhibits weakness of the system, and therefore in conducting the treatment, depleting remedies should be avoided. Such are very successful in causing the inflammation to disappear most quickly, but it is because the skin ceases to be the organ of

the crisis. We have seen the brain and stomach metastatically affected in consequence of the supposed cure of the disease. Females are more liable to it than males, and as it often appears in them at the cessation of the menstrual discharge, it has been termed *erysipelas climactericum*.

In treating senile erysipelas the usual local applications should be carefully avoided. There is no room for trifling. Structural disease of the brain, or of the thoracic or abdominal viscera, will quickly follow its repression. The patient must be thankful that he has the disease, and diaphoretics should be given, as Dover's powder, valerian, camphor, and the acetate and succinate of ammonia, to encourage the cutaneous action. If gastric symptoms should appear, an emetic will be useful, followed by a laxative, and if the disease be periodic, an aperient should be given every four weeks. The affected limb must be wrapped in pads filled with aromatic herbs, and the inner surface rubbed with camphorated liniment. If the erysipelas have disappeared, hot fomentations, the ammoniated liniments, and blisters should be applied to the limb to recall the morbid action to the surface. When the patient has tolerably recovered from the attack, an issue should be formed at a convenient point, and carefully kept open.

Erysipelas in persons turned sixty years of age is usually a *malum signum*. It is premonitory of an approaching break-up, and of death in from one to four years, according to the strength of the individual. This usually takes place in spring or autumn, but most frequently during the latter season.

Having selected these gouty affections from the others described by our author, we must here close our review. We can only here repeat that this kind of publication was a desideratum which Dr. Canstatt's work supplies. We should be glad to see it in an English dress, with notes, as it would thus fill up a manifest gap in our own medical literature. The text, however, should be abridged and the matter somewhat rearranged, so as to avoid those many repetitions as to the exciting and predisposing causes of disease in which Dr. Canstatt indulges. They may give the work an appearance of fulness and completeness, but render it larger than necessary; no trifling fault in these book-making days.

Art. VI.

Lectures on the Principles and Practice of Physic, delivered at King's College, London. By Thomas Watson, m.d., Physician to the Middlesex Hospital. In Two Vols.—*London*, 1843. 8vo, pp. 830, 812.

In rising from the perusal of this work,—for large as it is and recent as is its publication, we have read the greater part of it,—we feel irresistibly tempted to follow the example of certain reviewers, vulgarly denominated of the "Gutting School," and transfer the greater portion of it to our own pages. By this proceeding we should certainly achieve several objects which the gentlemen of this school regard as of paramount importance. In the first place, we should save ourselves a vast deal of trouble; as, instead of having to study the subject of the book both in itself and in others of the same kind, and thence to educe at once a true representation of the actual state of the things under discussion, and a critical judgment of the form in which they come before us,—we should merely,

in skipping over the pages, have to mark in pencil all the passages to be extracted, and then get these orient pearls, strung at random, on the slenderest possible thread of our own manufacture. Secondly, we should save ourselves not a little money: as, in a manufactory of this sort, no other contributors but ourselves, the scissors, and the printer being requisite, we should have none of those compliments to pay at the end of the quarter which we feel it our duty to gently force upon our friends, as being the only means we know of securing our own independence and usefulness. Thirdly, we should add vastly to our own comfort and pleasure; as it would surely be much more agreeable to dig, quarter after quarter, for a year or two, out of Dr. Watson's gold and silver mines, or to heap our measures from his redundant granaries, than to torment our spirit in everlasting research after hidden treasures throughout the world; pounding the obdurate rocks into barren dust; or wearying to death our poor critical microcosm in first threshing the ears from the mountains of straw and then winnowing the grains from the hills of chaff. And, lastly, should we not thereby entitle ourselves to the gratitude of our readers, and increase the numbers thereof, by saving *their* purses also,—by giving them that for a few shillings which it might cost them many to get otherwise? To be sure the author might perchance complain that the condition of *his* purse was but little consulted in the matter; and that, while he was held up to the admiring world as the greatest of writers, he had to look elsewhere than to his publisher for the payment of his printer and paper-maker. But what of that? The "Gutting School" cannot swerve from its principles for considerations of a private nature; and the frequenters, and auditors, and readers of this school must not have their appetite baulked or their exchequer impoverished by any falling-off in their periodical supplies.

But as our hand is not yet well broken-in to this kind of work, we hope our readers will excuse the barrenness of our first essay; and allow us, before we commence our pearl-stringing, to say a few words, in our old fashion, respecting the general qualities and character of the *corpus delicti*, or subject to be gutted.

"The following lectures," says the author, in his modest advertisement, "were put together with unavoidable haste during the medical session of 1836-7, in which they were first delivered. They were repeated, with slight variations, for four successive years, the author always meditating but never finding time to accomplish their thorough reconstruction and revision. They were afterwards printed, to fulfil a rash promise, in the pages of the Medical Gazette; and they are now published in a collected form at the request, formally conveyed to him in writing, of many who had heard or read them, including many of his colleagues at King's College. . . . . As they were passing through the press, such additions and alterations have been introduced as the author would have made had he continued to deliver the lectures orally." (pp. iii-iv.)

The medical profession is under great obligations to the gentlemen, whoever they were, who induced the author to publish his lectures in their present form, as its members have thus obtained for their help and guidance a better and completer system of medical practice than they were before possessed of; and the medical literature of this country has been enriched with a work of standard excellence, which we can proudly hold up to our brethren of other countries as a representative of the actual state of British medicine as professed and practised by our most

enlightened physicians. And, for our own parts, we are not only willing that our characters as scientific physicians and skilful practitioners may be deduced from the doctrines contained in this book, but we hesitate not to declare our belief, that for sound, trustworthy principles and substantial good practice, it cannot be paralleled by any similar production in any other country. And yet the author is very far from claiming any such character for his book; and we feel pretty certain, from the unpretending and modest way in which he expresses himself on all occasions when his own opinions are in question, that he does not believe it entitled to such honour. "The lectures," he says, "do not profess to present a formal and complete treatise on the practice of physic, much less to exhaust the various subjects upon which they touch. His chief hope is that they may prove a text-book for students."

That they will form an admirable text-book for students, in one sense, we do not doubt; but hardly in the common meaning of that phrase. The work is too large and too minute, in fact too good, for the use of the young student during his early attendance at the lecture-room and hospital. He requires something much more compendious; and we would be glad if Dr. Watson could find time to write such a book; he need not go one step beyond these lectures for materials for an admirable one. To the advanced student, however, and still more to the junior practitioner, these lectures will prove invaluable; and we would advise no one to set himself down in practice unprovided with a copy. Even among the old and experienced practitioners we venture to say there are few who will not benefit by a perusal of this work. Containing, as it does, all the more recent medical doctrines, without overlooking the old; combining the physiology, pathology, and morbid anatomy of recent times with the facts deduced from ancient observation; testing all theoretical views by the results of practical experience; weighing and checking everything—whether fact, doctrine, or opinion—with candour and calmness; and imbued throughout with that indefinable something which springs from strong common-sense;—it cannot fail to be acceptable and useful to every medical reader, whether young or old. The style of the lectures, too, is excellent. Simple, plain, and familiar, as the lecture-room required, they are, at the same time, most accurately and even beautifully written; combining the chaste graces of classical scholarship with the racy strength of our native Saxon. In the whole ninety lectures contained in these huge volumes, we have scarcely met with a single objectionable expression; while in every page we have been charmed with those nameless elegances which betray at once the native taste and the academic breeding of the writer.

Such of our readers as have observed how frequently we have felt ourselves called upon in this journal to expose and condemn the style of the medical writings that come before us, will not be surprised at this expression of our satisfaction with Dr. Watson's. And we may take occasion to add, that the volumes before us are yet more free from every tincture of those graver delinquencies which it has so often been our painful duty to expose. In Dr. Watson's pages the most critical eye will detect no defect of this kind. So far from any attempt to exalt, directly or indirectly, his own credit before his auditors, he never speaks of himself but with the greatest modesty; and never utters an expression cal-

culated to depreciate others unjustly. At the same time, he delivers his own opinions with freedom, and his judgments with firmness; and never hesitates to condemn in others what he deems objectionable. But the hearers of Dr. Watson's lectures must have felt convinced that in him they had a professor no less qualified to be a guide in the path of pure professional morality, than an instructor in professional knowledge; and no one will rise from the perusal of them in their present shape without bearing away with him the gratifying conviction, that the author is as much a man of the strictest honour, as he is a most accomplished physician.

And now to our pearl-stringing.

The first lecture is introductory, giving a general view of the subjects to be treated of, and of the proposed method of treating them. It affords a good sample of what is to be expected in the book. It takes broad, comprehensive, common-sense views of the subject; without any useless refinement, any announcement of trifling theories, or any covert magnifying of the lecturer. He professes to teach only *the principles* of medicine:

"The *practice* of medicine, or the particular application of those general facts and doctrines, I shall describe to you, but I cannot profess to *teach* it in this room; nor can you learn it, except in a very imperfect sense, from my description of it. It is the *science* that I shall here endeavour to unfold. Skill and facility in turning that science to useful purposes I am unable to impart. These are qualities that do not admit of being communicated from one mind to another. The practice of physic, like every other practical art, is to be learned by its repeated exercise, by habit, by carrying its various acts into direct effect again and again, or if they happen to require no manual dexterity, by looking on, and seeing them done again and again. There is this capital difference, however, between the art of healing and some other arts: that the blunders of early attempts may be both grievous and irremediable—may hurt or spoil the goodly and precious machine they are intended to repair." (p. 10.)

The lecture concludes with the following beautiful exposition of the responsibilities and privileges of medical teachers and medical practitioners:

"The subjects with which we have to deal are not matters of mere speculative curiosity or intellectual amusement—to be taken up to-day and dismissed perhaps with unconcern to-morrow; but they involve questions of life and death. The opinions you are now to form or to embrace are, for the most part, the opinions upon which in after-life you will confidently and constantly be acting. The comforts or the misery of many families may probably hang upon the notions that each of you will carry from this place. Therefore it is that I feel myself to be engaged in a very serious undertaking. Doctrines and maxims, good or bad, flow abroad from a public teacher as from a fountain, and his lessons may become the indirect source of incalculable mischief and suffering to hundreds who have never even heard his name. These reflections fill my mind with an almost painful sense of the obligation imposed upon me, by my present office, of closely sifting the facts, and of carefully examining the principles to be derived from those facts, which I propose to employ for your instruction and guidance.

"But amid all the responsibilities, gentlemen, both as teacher and learner, the profession which you and I have chosen, or which circumstances have prescribed to us, is a noble profession, and worthy the devotion of a life-time. If you fit yourselves now for its high functions, and pursue it hereafter with earnestness and truth, it will probably conduct you to an honorable competence, and it will assuredly prove a salutary school of mental and moral discipline. Trials, no

doubt, belong to it, and difficulties; but it has also privileges and immunities peculiar to itself. Affording ample scope and exercise for the intellect, it is conversant with objects that tend to elevate the thoughts, to chastise the feelings, and to touch the heart. I have already reminded you how it brings beneath our minute and daily notice that most remarkable portion of matter which is destined for a season to be the tabernacle of the human spirit, and which, apart from that singularly interesting thought, excites increasing wonder and admiration the more closely we investigate its marvellous construction. The sad varieties of human pain and weakness with which our daily vocation is familiar should rebuke our pride, while they quicken our charity. To us are intrusted, in more than ordinary measure, opportunities of doing good to our afflicted fellow-creatures—of showing love towards our neighbour. Let us beware how we idly neglect or selfishly abuse a stewardship so precious yet so weighty. The profession of medicine, having for its end the common good of mankind, knows nothing of national enmities, of political strife, of sectarian dissensions. Disease and pain the sole conditions of its ministry, it is disquieted by no misgivings concerning the justice and honesty of its clients' cause; but dispenses its peculiar benefits, without stint or scruple, to men of every country, and party, and rank and religion, and to men of no religion at all. And, like the quality of mercy, of which it is the favorite handmaid, 'it blesseth him that gives and him that takes;' reading continually to our own hearts and understandings the most impressive lessons, the most solemn warnings. It is ours to know in how many instances—forming indeed a vast majority of the whole—bodily suffering and sickness are the natural fruits of evil courses; of the sins of our fathers, of our own unbridled passions, of the malevolent spirit of others. We see, too, the uses of these judgments, which are mercifully designed to recall men from the strong allurements of vice and the slumber of temporal prosperity; teaching that it is good for us to be sometimes afflicted. Familiar with death in its manifold shapes, witnessing from day to day its sudden stroke, its slow but open siege, its secret and insidious approaches, we are not permitted to be unmindful that our own stay also is short and uncertain, our opportunity precarious, and our time, even when longest, but scanty, if measured by our moral wants and intellectual cravings." (pp. 14-15.)

The first sixteen lectures, extending over a space of about 270 pages, are devoted to the important subjects usually comprehended under the head of general pathology. They give an admirable view of the present state of our knowledge. The various subjects are treated in the same bold style, indicated in the introduction; without partiality or prejudice, and with a constant subordination of the scientific or theoretical part to the results of observation and experience. The eighth lecture is on semeiology, and is worthy of the particular notice of the student. We cannot resist the temptation of selecting a few pearls from it, for the adornment and enriching of our string:

"*Symptoms and signs.* These words are not exactly synonymous, although they are frequently employed as if they were so. Even those medical writers who admit a distinction between them, have not always succeeded in clearly pointing out the difference. Signs are deduced from symptoms by arranging and comparing them, and noticing the circumstances under which they occur. Symptoms are obvious to all persons alike—to the nurse as well as to the physician: signs, for the most part, are such to medical eyes alone. Let me try to make this plainer by the help of an illustration. Symptoms may be considered as resembling so many *words*. When taken separately or put together at random, the words have no force or signification. Arrange them in due order, reduce them into a sentence, and they convey a meaning. The sentence is a *sign* or expression of something which is thus revealed. Symptoms become signs when their import can be interpreted.

"A certain crackling sound, of which I shall have much to say hereafter, is

heard (we will suppose,) in some part of a patient's lung, by the ear applied outside his thorax. This sound is a symptom; any one who listens may perceive it. It is even so far a *sign*, that it denotes the unnatural presence of a liquid in the lung, and the passage of air through that liquid. But the liquid may be one of several—mucus, or serum, or pus, or blood: we cannot tell by the sound alone which of these it is. But if we learn that the person in whose lung the sound is audible has been ill for a day or two only, that he has pain in his chest, cough, embarrassed breathing, and fever, we conclude that he is labouring under that serious disease, *inflammation* of the lung. The crackling sound alone could not assure us of this; nor without the addition of this sound could the pain, the laboured breathing, the cough, or the fever. Taken collectively, the symptoms constitute a *diagnostic sign*, and bespeak the existence of pneumonia." (pp. 115-16.)

The remarks on diagnosis and prognosis are excellent. We regret that our extracts must be so limited:

"*Diagnosis*. When we can once identify a given diseased condition, we obtain the privilege of watching the behaviour of that diseased condition, again and again, under the operation of therapeutic measures; and from that time the increase of our knowledge concerning the appropriate management of that particular disease becomes progressive and sure. The term experience is obviously misapplied, and the results of all observation are vitiated when any doubt exists about the sameness of the objects contemplated. It is mainly to this imperfection in the diagnostic part of medicine that we must attribute the uncertainty and variation both of doctrine and practice which have brought so much suspicion, and reproach and ridicule upon the science we profess. *False* experience, if I may use such a term, has greatly hindered the progress of the healing art; and *false experience* springs from *false diagnosis*. A man will tell you that he has cured a score of cases of advanced phthisis; but he has deceived himself: they were not cases of true phthisis, but simply cases of chronic inflammation, with puriform discharge of the mucous membrane of the bronchi. He publishes an account of his success, and of his plan of treatment; and thus he deceives others also; and thus he retards the science which he fondly and conscientiously believes he is promoting. Accuracy of diagnosis, therefore, cannot be too highly estimated, nor too diligently sought after." (pp. 112-13.)

Under the head of *prognosis* we have the following very sensible observations, which we quote for the especial benefit of young practitioners. By following the judicious advice here given, they may escape with credit from many perplexing and difficult dilemmas:

"There is always some risk of losing as well as of gaining credit by strong statements and predictions of the death or the recovery of a patient. If you give an unfavorable prognosis you have a good chance of losing your patient altogether; his friends argue very naturally, that you are not infallible, that you may be wrong, that if *you* know of no means of safety for him some other practitioner may, and they *will* grasp at whatever straw comes near them. Do not suppose that this is merely a selfish view of the matter: it is often of much moment to the patient himself that he should not be tempted to put his life under the charge of impostors, who will feed his hopes and promise largely, and torture him perhaps with their discipline, and have no mercy upon his pocket. Many an instance have I known of persons dying of consumption, who, when given over by their regular attendants, have been brought to London at considerable expense, to exchange the many comforts of home for the inconveniences of a hired lodging, that they might be *cured* by that ignorant, and cruel, and rapacious quack, Mr. St. John Long. There are other reasons, too, why we must sometimes conceal the truth from our patients. It often happens that a person is extremely ill and in great danger, but yet may recover if he is not informed of his peril. To tell a person in these circumstances that he is likely to die, is to destroy his *chance* of recovery. You kill him if you take away his hope of living. It must be confessed that

the duty of the medical man in these cases is very painful and embarrassing: the patient and patient's friends are urgently inquisitive to know whether there is any danger, or whether he is not yet out of danger. The rule which I have always adopted in circumstances of this distressing kind, when I see clearly that the case is hopeless of cure, is to fix as well as I can upon that person among the family or friends of the patient to whose prudence the real state of the matter may be the most safely confided. If I think that there is a possible chance of recovery, and that a knowledge of his danger by the patient would diminish that chance, of course I urge the necessity of speaking to *him* with assumed cheerfulness and confidence; if I see that the case is absolutely and inevitably mortal, either soon or at some little distance of time, I leave it to the discretion of the person with whom I communicate to disclose or conceal my opinion, as he or she may think best." (p. 114.)

Six lectures are devoted to the consideration of the important subject of inflammation, in its various forms and consequences: they are full of most valuable knowledge, both pathological and practical. We regret to let them pass without paying toll; and yet we hardly know what to select. The fourteenth lecture, on the *treatment* of inflammation, is particularly interesting; and we will extract a small part of what is said on the use and abuse of mercury:

"*Curative effects of mercury.* Next to bloodletting, as a *remedy*, and of vastly superior value, upon the whole, to purgation, in serious inflammations of various kinds, is *mercury*. This mineral is really a very powerful agent in controlling inflammation, especially acute, phlegmonous, adhesive inflammation, such as glues parts together and spoils the texture of organs. . . . . . . In common adhesive inflammation, whether of the serous or the cellular tissues; whenever, in fact, you have reason to suppose that coagulable lymph is effused, or about to be effused, and mischief is likely to result from its presence, then you may expect much benefit from the proper administration of mercury; as an auxiliary, however, to bloodletting, not as a substitute for it. On the other hand, mercury is likely to be hurtful in those forms of disease "where the morbid action approximates to its own action." In cases of erysipelatous inflammation having a disposition to gangrene; in scrofulous diseases; in inflammatory complaints attended with general debility, and an irritable condition of the nervous system, or a manifest tendency to take on a typhoid character."

"*Mode of action.* If we inquire what mercury does when it is administered to a person in health, we find three very marked effects following its internal use. They vary, indeed, in different cases and under different circumstances; but we know that the employment of mercury under any of its usual forms of exhibition is often followed by increased watery evacuations from the intestines; or by an increased discharge of bile; or by an increased flow of saliva; that is to say, it determines (as the phrase is,) to certain secreting organs—the mucous membrane of the bowels, the liver, the salivary glands; it augments their natural secretion? and in this augmentation of secretion is implied an increased afflux of blood to the secreting part. It is probable that mercury has a similar influence on most or all the secreting surfaces of the body, altering the condition of the capillary circulation throughout. And an explanation of its curative power in inflammation has been drawn from this fact: it has been supposed that mercury thus tends to *equalize* the circulation; that by causing the blood to be distributed in larger quantity than common upon *several* surfaces at the same time, it obviates *pro tanto*, its excessive congestion or accumulation in any one organ. Whether this hypothesis in respect to the *modus operandi* of mercury be true or not, I will not pretend to say; but it certainly is not an unreasonable hypothesis." (pp. 228-30.)

Treatment of mercurial sore mouth. There are few accidents more provoking to the young practitioner than the not uncommon, undesired, and unexpected supervention of profuse salivation during the exhibition

of mercury. We fear all the comfort we can give him in such a case is contained in the following extract. Like Dr. Watson, we have heard much of antidotes and potent expedients for speedy relief, but we never yet met with them in reality.

"You will constantly be called upon to do something for the relief of this disease (for so we must call it), which you yourselves, or some of your brethren, have with the best intentions inflicted. I have tried all sorts of expedients; and I have asked a great number of my friends what is the best plan to adopt in such cases: but I never could get much satisfactory information from them. Some thought purging was the best thing. Others recommended alum gargles, or gargles made with the chloride of soda; and these last certainly have one good effect, that of correcting the fetor. A dilute solution of chlorine in water, much used at the Middlesex Hospital, is better still. Others believed that sulphur, which has long been prescribed in such emergencies, was really of service; and some advised that the patient should be as much as possible in the open air: a few commended iodine. All admitted that they knew of no certain remedy. Neither do I. But there are two or three expedients which I am confident are often of very great use in checking the violence of the salivation, and in removing the most distressing of its accompaniments. If there be much external swelling, treat the case as being, what it really is, a case of *local inflammation:* apply eight or ten leeches beneath the edges of the jaw bones, and wrap a soft poultice round the neck, into which the orifices made by the leeches may bleed; and I can promise you that, in nine cases out of ten, you will receive the thanks of your patient for the great comfort this measure has afforded him. Pure tannin, moistened and smeared upon the spongy gums, is remarkably efficacious in rendering them firmer and more comfortable. But this is not always to be procured; and when the flow of saliva, and the soreness of the gums, formed the chief part of the grievance, I have found nothing more generally useful than a gargle made of brandy-and-water, in the proportion of one part of brandy to four or five of water. This last piece of practice I learned from the present apothecary to the Middlesex Hospital; I have tried it over and over again, and I tell it to you as a thing worth remembering. These little points are by no means to be despised. A very fashionable and successful physician, now dead, used sometimes to say when he met others of his brethren in consultation, 'It is all very well to speculate about the exact situation and the precise nature of the disorder, but the question with me is, "what is good for this, that, or t'other thing?"' A wise physician will seek to combine with an accurate knowledge of disease and settled principles of treatment, those practical expedients and minor appliances which are picked up by casual experience; which could never have been reasoned out, and which sometimes constitute nearly all that we can do for our patient's benefit." (pp. 232-3)

The concluding paragraph in the above extract contains the statement of a plain but important truth of wide applicability in practice. It is a specimen of that wisdom of common-sense with which we have said these lectures abound.

Ten lectures (xxi to xxxi) are devoted to the more formal and important diseases of the brain and spinal marrow; and in the succeeding seven (xxxii to xxxix) are considered the many analogous affections, which are referrible to functional disorder of some part or parts of the nervous system, &c., &c. We look upon the history of this great family of diseases, both in a pathological and practical point of view, as one of the most valuable portions of the work. An able exposition is given of the difficulties that beset the study of the diseases of the nervous system. We extract a portion of this:

"We often fail to discover *any* deviation from the natural condition of these

nervous centres, or of their appendages, even when the disorder of their functions has been broadly displayed. We are not to infer from this that no change has taken place in these parts. The only legitimate conclusion is, that the nervous functions are liable to be deranged, impaired, or suspended by altered conditions, not traceable by our senses or at least not yet discovered by us, of the organs which minister to those functions.

"There may be only one such undiscovered disturbing cause, variable in degree in different cases; or (what is more probable) there may be several such conditions differing in kind. A blow or fall which *jars* the brain, a sudden mental emotion, an electric shock, a tea-spoonful of prussic acid, any one of these causes may destroy life, yet leave no vestige of its action in the nervous substance upon which it operates. It is probable that the fatal condition is not in each case the same.

"We may even form a reasonable conjecture of the manner in which the invisible changes are sometimes brought about. We can conceive, for example, that *undue pressure* upon the nervous pulp on the one hand, or *insufficient pressure* on the other, may constitute conditions of the kind we are in search of; and I shall be able, I think, to convince you that such is sometimes the case. Again, we can conceive that such conditions may be furnished by the varying state of the cerebral circulation. In point of fact, we *know* of some changes in the circulation through the brain which have the effect invariably, first, of modifying, and at length, if they are continued, of arresting, the cerebral functions. If *no* blood be sent through the arteries of the brain, death in the way of *syncope* ensues; if *venous* blood circulates in those vessels, it leads to death by *coma*.

"But whatever may be the nature of the unknown, and perhaps fugitive, physical conditions of the nervous centres, thus capable of disturbing or abolishing their functions, it is useful to keep in our minds a distinct and clear conception of the fact that there must be some such physical conditions. By steadily retaining this idea of their real existence, we may hope at length to get some insight into their nature; which we are the less likely to obtain if we dwell only on the obvious and visible injuries effected in the nervous substance, associated, as they are apt to be, with so perplexing a diversity of symptoms." (p. 351.)

Dr. Watson adopts the views of Dr. Kellie and Dr. Abercrombie respecting the unalterable fulness of the vascular system of the brain; but contends, with them, that variations of the *relative fulness* of the different classes of vessels, or of the vessels of different parts of the brain, together with the *varying pressure* on the cerebral substance thence and otherwise resulting, may very plausibly account for many of the phenomena of cerebral diseases. We have nowhere seen this hypothesis stated with greater clearness or made more probable. We must, however, refer our readers to the work for a full view of its bearings. The following brief extracts may tempt them to consult it:

"But although the actual quantity of blood in the cerebral vessels may continue the same, it does not follow that the relative quantities contained in the arteries and veins should remain unaltered. . . . . . In a very plethoric condition of the body, the arteries which go towards the head partaking of the general fulness, it is not difficult to conceive that there will be an impulse or effort *tending* to the propulsion of an undue quantity of blood into the arteries *within the cranium*; and, under certain circumstances, actually producing a fuller state of those arteries at the expense of the cerebral veins. On the other hand, any sensible interruption of the return of the blood through the veins will virtually augment that impulse upon the arterial current which arises from the force of the general circulation. It is true that we cannot measure or weigh, so as to compare them together, the actual quantities of arterial and venous blood circulating at any period in the cerebral vessels. We never, therefore, can have any demonstrative proof that the kind of derangement, the alteration of balance that has just been supposed, does really occur; but as it evidently, in the nature of things, may occur, so many physiolo-

gists believe that it actually does take place, under various circumstances of disease. And taking for granted not only the possibility, but the positive existence of such a derangement, we are enabled to explain many remarkable circumstances connected with the pathology of the brain which might otherwise be altogether mysterious and inexplicable. We can understand how it may happen that a person shall fall down insensible, become completely comatose, and perish, and yet, on the examination of his brain, there shall be found no trace of inflammation or of softening, neither extravasated blood, nor effused serum, nor any change that our senses are capable of estimating. . . . . But there is another principle by which many of the same derangements that leave no vestige behind them in the corpse may, with *equal or greater probability*, be explained. I mean the principle of *varying pressure* upon the nervous substance. Physiologists say that the cerebral matter is incompressible. Upon what grounds this opinion, (which lies at the bottom of the whole of the foregoing doctrine,) may rest, I know not: but whether the brain be compressible or not—whether, that is, it be or be not reducible by pressure into a smaller compass—it is clearly capable of having different degrees of pressure applied to it, and of being pressed out of its ordinary form. We shall see hereafter that by pressure exercised from within, by the distension of what are called the ventricles of the brain, the convolutions on its surface are sometimes flattened, and the natural furrows between them nearly effaced. Pressure there certainly is in what I shall have to describe to you as *hypertrophy* of the brain. There must be considerable pressure on the nervous pulp when blood is poured out within it from a ruptured artery in a cerebral hemorrhage. But the phenomena noticeable when a portion of the skull has been removed by the trephine, show very clearly that the encephalon sustains pressure from varying states of the circulation during perfect health. The surface of the brain, seen through the circular opening in the bone, is observed to pulsate, and to pulsate with a twofold motion. With every systole of the heart the surface protrudes a little, and it again subsides with the succeeding diastole. This shows that the tension of the arteries produced by every contraction of the ventricles of the heart, exerts a degree of pressure upon the contents of the cranium. . . . . It is certain, then, that whether the cerebral pulp yields to it or not, there is a constant alternation of a greater and a less compressing force exerted upon it, during life. . . . . It is equally certain that the compressing force may transgress its natural limits in either direction; may be too great or too little. The functions of the nervous centres may be perverted or lost when the pressure becomes excessive or, on the other hand, when the pressure is insufficient. . . . . . The pressure may cause fatal coma, and yet no evidence of its operation be left in the dead brain; in cases of *permanent* disease with *occasional* symptoms, accidental circumstances may from time to time determine an undue amount of compressing force or a deficient amount." (pp. 354-60.)

The account of delirium tremens, in lectures xxiii and xxiv, is excellent. The experienced practitioner will at once acknowledge the fidelity of the following graphic description of it; and we should think the student who reads it attentively cannot fail to recognize the disease the first time he sees it. And yet our own experience, and no doubt that of every old physician, accords with that of Dr. Watson as to the frequency with which this purely nervous affection is confounded with inflammation of the brain and its membranes, to the great injury of the patient and the frequent loss of character of the practitioner:

"You will be summoned to a man who is supposed to be mad, or to have brain fever. You find him with a red face, perhaps, and injected eyes, talking wildly and incessantly, fidgeting with his hands, affected often with tremors of the limbs, having a rapid pulse, and bathed in sweat. Now it is very natural that a person not on his guard should look upon these symptoms as indicating inflammation within the head. But if you look closely into the matter you will find in the state

of the patient and in his history, some things very peculiar. The delirium you will generally find to be not a fierce or mischievous delirium, but a *busy* delirium: he does whatever you desire him to do, but he does it in a hurried manner, with a sort of anxiety to perform it properly. During the approach of the malady, while he is yet able to go about, he manifests great impatience of any interference, or advice, or assistance in his ordinary duties, which he sets about in a bustling and blundering manner. His loquacity is extreme, and he refers to matters that are not present before him; he is not altogether inattentive to the objects and proceedings that are going on around him, but his mind wanders away to other subjects. There is an odd mixture of the real and the ideal in his thoughts and language. Sometimes he is very suspicious that those who are about him intend him some injury; or that he is surrounded by enemies. You will find also that he does not sleep; that he has not slept perhaps for several nights, but been restless and rambling: and you will generally learn that he has been habitually intemperate, or subject to some great source of care, or anxiety, or excitement: and in many cases he has recently been somehow or other debarred from his customary stimulus. In addition to these points in his history, you will frequently be told that having been unwell, first he has been kept upon low diet, and then, as the delirium came on, he has been freely bled; and that he has been none the better, but commonly worse, for the bleeding. When you gather such particulars as these from his friends (for upon his own statements you cannot place any reliance,) and when you find the delirium to have the characters I have been attempting to describe, and especially when there has been obstinate watchfulness, and the tongue is moist, and the skin is sweating, you may be pretty certain that your patient is affected, not with inflammation of the brain, but with delirium tremens; and that if you bleed him further you will make him worse." (pp. 38-9.)

We must refer to the work for the treatment of this disease. Although Dr. Watson agrees with all practitioners of experience, that opium, in some form or other, is the grand remedy; yet he properly warns his readers that it is not to be given indiscriminately, or trusted to alone. In some cases it must be administered cautiously, if at all; in others it must be combined with depletion in some form; and in others, again, with strong drinks; while, generally, it must be combined with nourishment. In the most common class of cases the following treatment is certainly that which will be found most effectual:

"The opium must be given in full doses; and it must be fearlessly repeated if its desired effect does not follow. If the patients pass many nights without sleep, they will die. I have tried various forms of opium; and I am quite satisfied with morphia. Some persons, however, have not found it so successful as solid opium, or as the common tincture, laudanum. You may try the one or the other, or the one after the other, if you please. No particular rules can be laid down that will suit all cases. After clearing out the bowels by a moderate purgative, you may give three grains of solid opium; and if the patient show no inclination to sleep after two or three hours have elapsed, you may begin to give one grain every hour till he does sleep. Or you may prescribe corresponding quantities of the acetate or muriate of morphia, or of laudanum, or of the black drop, or of Battley's sedative liquor. His room, meanwhile, should be kept dark and quiet. If he sleeps for some time he will awake calmer and more sensible, perhaps perfectly so; and you must withhold the remedy, or continue it in smaller or less frequent doses, according to the circumstances of the case. . . . . . Sometimes this opiate treatment alone is quite enough; sometimes it is not. You will meet with patients who resist very large doses of the drug; but who presently sleep or become composed if you give some of their accustomed stimulus with it,—'a hair (as the vulgar saying goes) of the dog that bit them;' if you put their opiate dose into a glass of gin or a pint of porter. Nervous *exhaustion* goes along with and augments the nervous irritability. . . . . If you learn that, notwithstanding the intemperate

habits of the patient, his appetite for food has continued unimpaired and his digestion sound, you will, I believe, generally find that good nourishing diet, strong broths, for example, and the opium, will suffice for the cure. But if the powers and natural sensations of the stomach have been injured and perverted, as is too often the fact, then a temporary recurrence to the habitual stimulus will frequently be necessary; and it is well to ascertain in such cases what the stimulus has been, whether spirits, or beer, or wine, and to order it accordingly. Of course this is not to be continued after the patient has recovered from his delirium." (p. 395.)

In lectures xxvii and xxviii we have an excellent account of the inflammatory and structural diseases of the spinal cord,—a class of cases which may be said to have only been wrought out as definite morbid states in recent times. The author most justly observes, that "the structural diseases of the spinal cord will most clearly reveal themselves by their symptoms to him who most distinctly perceives, and most accurately bears in mind, the *physiology* of that part of the nervous system;" and for this reason he very judiciously prefaces his account of them by a brief but explicit account of the anatomy and physiology of the spinal marrow. (pp. 554-8.)

Returning to the subject of strictly cerebral diseases, the author enters upon the consideration of apoplexy in lecture xxviii, and devotes the greater part of four lectures to it. This portion of the work is rendered extremely interesting by the relation of many striking cases. We had marked numerous passages for extract, but we must content ourselves with a very few specimens. The young practitioner, fresh from the schools and full of the physiology of the nervous system and of the pathological anatomy of the brain, may think it unlikely that he should ever confound real apoplexy with simple coma from mere temporary causes, as from drunkenness; and yet he will find the diagnosis not always easy in practice. So, at least, Dr. Watson says; and so we ourselves have found it on more than one occasion.

"If you were summoned to a person in the comatose state I have been describing, how could you tell whether he was affected with apoplexy or labouring under the influence of a large dose of opium, or merely dead-drunk? Why, so far as the cerebral functions are concerned, you cannot discriminate the one from the other. In each case there is profound coma; but the cause of the coma is different in each, and you must seek to ascertain that cause in the history and other circumstances of the patient: you inquire whether he is known to have been drinking, you try if you can perceive the odour of wine or of spirits in his breath; or you endeavour to make out whether he has been low-spirited or in known difficulties; in short, whether it is likely he may have swallowed poison. But from the actual condition of his sensorial functions, you cannot solve the question." (p. 470.)

In the two following cases, related in illustration, the proper diagnosis was made; but we quote them as instances of a condition which we have known mistaken for apoplexy. The second case is an example of the happy and amusing manner in which Dr. Watson so often illustrates his subject:

"A man was found lying in Smithfield in a state of total insensibility, and motionless, except that he still breathed. He was carried into St. Bartholomew's Hospital. The house-surgeon thought he smelt the smell of gin in his mouth, and thereupon very properly made use of the stomach-pump; by means of it he discharged a large quantity of ardent spirit; and in the course of a few minutes

the man revived, shook his ears, and walked away. If the gin had been suffered to remain in the stomach, and if the remedies of apoplexy had been vigorously put in force, the absorption of the poison would have been thereby accelerated; and the debauch would probably have had a fatal termination. . . . The father of the late professor James Gregory of Edinburgh (who used to relate the case in his lectures,) was once called out very late in the evening to visit an old gentleman of that place. He found him in a completely comatose condition, his wife crying, and his household all plunged in grief and distress. They told him that the patient, whom he now saw in a fit, had come home, and upon the servant's opening the door to him, had fallen into the passage, on his back, in a state of insensibility. Dr. Gregory learned, however, that he had been at the 'club,' and he knew well enough that this club was composed of choice spirits, fond of their cups, although the gentleman's wife did not know as much. Therefore he ventured to express his 'hopes' to the wife that her husband was drunk: a very charitable view of the case, at which she was extremely affronted and indignant. He persisted, however, in his opinion, and not long afterwards the patient began to recover his senses. It turned out that he had partaken more liberally than the rest of the club, and was the *first* to be intoxicated. Two of his companions carried him home quite incapable of motion; but not liking to introduce him themselves to his wife in that predicament, they placed him with his back against the door, rang the bell, and decamped. Of course when the servant came to open the door, his master tumbled senseless on the floor. I need not point out to you the ridicule which the physician would have brought upon himself, and the damage he might have inflicted upon his patient had he busily applied, in this case, the ordinary remedies of apoplexy." (pp. 470-1.)

It has long been received among physicians as an almost settled point in pathology, that hypertrophy of the heart is a common exciting cause of apoplexy. Dr. Watson denies this as a general truth, and gives numerous strong reasons for considering the two events as mere coincidences, and not standing in the relation of cause and effect. (pp. 515-7.) Dr. Watson's views on this point are held by others. (See our Review of Canstatt in the present Number, p. 111.)

As usual, the treatment of this disease inculcated by Dr. Watson is discriminating, and running into neither extreme. The following graphic illustration of "active practice," so much in vogue with some practitioners in this disease, contains a lesson of most grave import:

"Practitioners are too apt, in this, as in other instances, to be guided in their choice of remedies by the *name* of the disease, and to treat all cases of apoplexy alike. I remember being much amused by the perplexity which a friend of mine once told me he had felt on being summoned by letter many miles into the country to see a gentleman who had been struck with apoplexy. As he posted down, he earnestly revolved in his mind what he might be able to advise when he should reach the house of sickness. He felt confident that the patient must already have been copiously bled, cupped or leeched, blistered, and thoroughly dosed with calomel, senna, and croton oil. Mustard poultices had doubtless been applied to his legs. My friend was distressed to think that while much would be expected, nothing would be left for him to do worthy of so long a journey, and so heavy an expense to his client. A clyster of turpentine might yet, perhaps, be an untried expedient. His cogitations were cut short, however, and his cares relieved, by an express which met him half-way on the road to announce that the patient was dead." (pp. 519-20.)

The important practical question respecting bloodletting in apoplexy is pretty fully discussed. Although Dr. Watson's practice is, in this respect, very discriminating, we are not sure but some of his readers will consider him as leaning rather too much to the side of depletion. At the present time, however, there is some danger lest the ill effects of indis-

criminate venesection, now so fully recognized, may not lead to a practice as dangerous in the opposite extreme. The following extracts show that our author can give good reasons for his treatment, whether it is to bleed or to refrain from bleeding:

"If the pulse be full, hard, or thrilling, (sometimes it feels like a tense vibrating rope,) or if there be obvious external signs of plethora of the head, you must extract blood. You are not to refrain from bleeding the patient because he is pale, if the pulse warrants it; nor may you omit taking blood if the head and face be turgid, although the pulse be small, for that smallness may depend upon organic disease of the heart. On the contrary, if his skin is pale and cold, and his pulse feeble and flickering, you would probably ensure your patient's death, or determine the accession of palsy, if you withdrew from the failing heart and blood-vessels a portion of their natural stimulus. . . . . . If the patient to whom you are summoned be stupid and drowsy rather than faint, and his pulse and appearance warrant the conclusion of plethora capitis, the first thing to be done is to place him in a semirecumbent position, with his head raised; to loosen any tight parts of his dress, especially his neckcloth and shirt-collar, and whatever might press upon the *neck;* and then as quickly as possible to bleed him from the arm. We know that in some cases the apoplectic state occurs when as yet no injury has been done to the brain—no effusion, no laceration of its texture—and we may hope, by timely and vigorous measures, to *prevent* these terrible evils. We never can be sure that there is blood extravasated in such cases, and we must act, in the first instance, upon the presumption that there is not. We are especially encouraged to take away a considerable quantity of blood by venesection when we perceive external signs that the vessels of the head are full, redness and turgescence of the face, throbbing and prominence of the temporal arteries, distension of the superficial veins of the neck and forehead. Our object is to take off the strain upon the internal vessels by bleeding in such a manner and to such an amount as shall produce a decided effect upon the general circulation. . . . . . Again, the whole state of the patient may approximate more or less nearly to the state of syncope; the pulse being weak, the aspect pinched and bloodless, and the skin cool. In this condition no good, but the contrary, is to be expected from bloodletting of any kind. You will do better to apply warmth, cautiously, to the surface, and cautiously to administer what are called diffusible stimuli, of which the preparations of ammonia afford the most eligible forms. Five grains of the sesquicarbonate, or half a drachm of sal volatile, mixed with camphor, julep, are ordinary doses. Stand by till the first stunning effect of the internal shock passes off; and carefully watch meanwhile for symptoms of reaction." (pp. 520-3.)

Of the propriety of purging there is much less difference of opinion; and there is little risk in being too active here:

"Purgative medicines are of signal service in apoplexy. They empty the intestines, which are oftentimes loaded, and which, by distending the abdomen, have occasioned, perhaps, undue pressure against the diaphragm, embarrassed the breathing, and through it the cerebral circulation. Another very important purpose of hard purging, which I have frequently pointed out before, is the producing of copious watery discharges from the bowels, whereby the blood-vessels are drained, and the tendency of blood to the head especially relieved. If the patient can still swallow, you may give him half a scruple of calomel, and follow it by a black dose. If the power of deglutition be lost, the croton oil becomes a most valuable remedy. Dr. Abercrombie suggests that it may be conveniently introduced into the stomach, suspended in thick gruel or mucilage, by means of an elastic gum-tube. But really this is not necessary. If two or three drops of the oil be put upon the tongue, as far back as possible, it will produce its specific effect very readily and well. But we are not to wait for the operation of aperients given by the mouth. Strong purgative and stimulating enemata must be thrown into the rectum; half an ounce or six drachms of turpentine suspended, by the

help of the yelk of an egg, in gruel or warm water. We very often witness decided signs of amendment upon the free operation of a purgative." (pp. 523-4.)

In the thirty-first and thirty-second lectures we have a very full and interesting account of the various kinds of *local paralysis*, more especially of the most common and important form, *facial palsy*. There are few diseases which are more calculated to exhibit to patients the pathological and physiological knowledge of the physician than this; and therefore it is one that it is especially the interest of the young practitioner to study. Before the full light of physiology was thrown on it by Sir Charles Bell, it was very apt to be considered as having its origin, like other forms of paralysis, within the skull; and patients were often treated very improperly in consequence. The danger, at present, perhaps lies on the other side. The affection is now so well known as to be taught in all the schools; and it will probably be easily recognized by most men when first met with in practice. It may, however, not always be remembered, that the same external phenomena sometimes acknowledge an internal cause precisely similar in kind to that of hemiplegia. Cases of this kind are extremely perplexing; and it behoves the young practitioner well to weigh all the symptoms of each individual case before he delivers a positive diagnosis and prognosis. The present work will afford him most important assistance towards the establishment of correct views. The following case offers one of the best illustrations we have met with, of the kind of cases now under consideration; its features of danger, though sufficiently obvious to a man of experience, as they were to Dr. Watson, might very readily have been overlooked by a young physician:

"The following case caused me much anxiety, for the subject of it was a personal friend of mine. I was summoned to his house in the autumn of 1829, and found him with complete palsy of the left side of the face. It had existed a day or two. I shall not describe the appearances and symptoms that resulted from the paralysis; for they were precisely the same as were presented by the girl Smith; [a case of purely local facial palsy;] and they are always, and necessarily, very much alike. But though the *palsy* was strictly limited to this set of muscles, there were other symptoms present which indicated that the interruption of the functions of the portio dura was connected with some morbid condition within the cranium; nausea and vomiting, twitching of the muscles of the *other* side of the face, great drowsiness, and a slow pulse, forty-eight only in the minute. He lurched also, and staggered as he walked; but he distinguished this from the reeling of the vertigo, and denied the latter sensation altogether. He was deaf, too, on the affected side.

"His previous history did not tend to diminish the fears which his actual state excited. In the previous February he had been attacked rather suddenly, with intense pain just above the right eyebrow, and became extremely drowsy. Being desirous, on account of those feelings, to excuse himself from a dinner engagement, he found that he was unable to write a proper note: he could not remember how he ought to express himself. All these symptoms soon passed off, after the operation, I believe, of an emetic. But he had another attack of the same kind in the subsequent May—the same severe pain over the right brow, with great drowsiness and confusion of mind. He could not recollect the first line of the Æneid. He wished a friend to look at the *signatures* of some letters that arrived; and though he knew the root, he could not tell how the word he wished to use was formed—whether it was signition, or signation, or signature. The digestive organs on this occasion were made the object of treatment, and he soon got well. There was another instructive part of his history, and therefore I mention it. Before these attacks he was in the habit of eating and drinking freely, and his power of digestion was supposed to be enormous. After the attack

in May he commenced a strict course of temperance. He drank no wine *till three or four days before* the occurrence of the facial palsy; he had then taken it again, and had about four glasses daily, and on one of the days he drank two glasses of champagne.

"It was of some moment to this gentleman, not only that he should recover, but that he should recover quickly. He had been appointed by government to a mission to Ceylon, and all his equipment was already on board a vessel, which would sail in a fortnight. Cupping behind the ears, blistering, purgatives, and small doses of calomel continued till the gums were slightly sore, removed the paralysis and all the other symptoms, in about ten days. He went to Ceylon, and performed his mission so ably that after his return the government appointed him to one of far greater importance in India, where he now is. He has remained perfectly well, and possesses one of the clearest and strongest intellects that I am acquainted with." (pp. 542-3.)

The next eight lectures (xxxii to xxxix) are devoted to tetanus, hydrophobia, epilepsy, chorea, hysteria, and neuralgia; and are full of interest of every kind. But here our readers must cater for themselves: we guarantee them from disappointment. From among the many passages marked by us for quotation, we will select part of one on the diagnosis of epilepsy and hysteria, because this also is a point which is very apt to puzzle and distress young physicians; and not without good cause, as Dr. Watson testifies:

"It is of great importance to be able to render the diagnosis certain and accurate. It is a dreadful announcement to have to make to a father or a mother that their child is epileptic; whereas hysteria, though it is sufficiently distressing, is attended, in nine hundred and ninety-nine cases out of a thousand, with no ultimate peril either to mind or body. In some instances the diagnosis is perfectly easy, in others it is dubious and full of anxiety. Whenever you fail to satisfy yourselves completely as to the nature of a given case, you will do well, in legal phrase, to give your patient the benefit of your doubt, and acquit her of epilepsy, or pronounce her guilty of the minor offence of hysteria." (pp. 668-9.)

The following extract gives some of the more important marks of distinction during the convulsive paroxysm:

"In the epileptic *fit* there is an entire loss of consciousness. The patient, on emerging from the paroxysm, recollects nothing of what has been going on during its continuance. It is not so in the hysterical fit, the loss of consciousness is very seldom complete, and it never occurs at the outset of the attack. The patient often is able to repeat, (though she may not always choose to confess it,) what has been said by the bystanders during the period when she seemed insensible. This is a point of distinction well worth remembering, for more reasons than one. It not only helps the diagnosis when the fact comes out, but it suggests certain cautions to ourselves. We must take care not to say anything by the bedside of an hysterical patient which we do not wish her to hear; and we may take advantage of her apparent unconsciousness, and pretend to believe in it, and speak of certain modes of treatment which she will not much approve of, but the very mention of which may serve to bring her out of the fit.

"In the epileptic paroxysm the face is usually livid; and foam, which is frothy with air or red with blood, escapes from the patient's mouth. These are symptoms which we do not see in the fits of hysteria. The convulsive movements even offer some characteristic shades of distinction. In epilepsy they are often more marked on one side of the body than on the other, and less irregular; the same movements are rapidly repeated; there is a strangling rattling in the breathing; while in hysteria the forcible flexion and extension of the limbs and the contortions of the trunk are more sudden and, as it were, capricious; the respiration is deep, sighing, mixed with cries and sobs and often with laughter. But perhaps the convulsive motions differ most in the face; the epileptic expression is usually frightful; the eyelids half open, the eyeballs rolling, the mouth drawn to one side, the teeth grinding,

the gums exposed by the retraction of the lips, the tongue protruded and bleeding, the complexion leaden: while in hysteria the cheeks are red, but at rest; the eyelids are closed and trembling; if you raise the upper one you will see the eye fixed, perhaps, but it is bright, and very different from that of the epileptic, which, if it be not rolling, is dull, projecting, and the pupil usually dilated." (pp. 669-70.)

The diseases mimicked by hysteria are not overlooked by our author; and the young practitioner will perhaps be surprised to find among the number some inflammatory affections which he may think it impossible to be aped sufficiently well to deceive him. Let him, however, be not over confident. The following paragraph recalls to our recollection, after a period of some five and twenty years, the case of a young lady, which we maintained to be peritonitis, against an experienced apothecary with whom we were called to consult. In our pathological zeal, in those early days, we would have almost suffered martyrdom in support of our opinion; but, alas, in a day or two the hysteric tympany, for such it was, suddenly disappeared, and carried away our school-pathology and our comfort for the time along with it. We have seen many such cases since; but as our knowledge of actual disease augmented, our confidence in nosological definitions, and eke our alacrity for pathological martyrdom, abated in like proportion.

"One of the diseases which is most often copied by hysteria, is *inflammation of the peritoneum*. You will find a patient complaining of acute pain of the abdomen, aggravated by the slightest pressure; and she shall have, perhaps, a hot skin, a quick pulse, and a furred tongue. When you meet with such symptoms in a young female in whom there is any derangement or irregularity in the uterine functions, you will do well, before you bleed her to syncope and cover her abdomen with leeches, to ask yourselves whether all this suffering may not be simply nervous. Search into her previous history as narrowly as you can; if you find that she has had similar attacks before; if she has been known to suffer hysterical fits; and if the tenderness is excessive and, as it were, superficial, felt upon the slightest touch as much as when the firmer pressure is made, you may generally spare the bloodletting, purge the patient well, and cause an assafetida enema to be thrown into the rectum; and in a few hours you will find that the peritonitis has vanished." (p. 672.)

But having got nearly to the end of the first volume of our book, we must hold our hand. Our readers must find out for themselves what the second contains. We will only say, that both are from the same mint; and the last has the same ring of true metal as the first. We hope, however, by what we have done, we have shown ourselves qualified at least for the membership of the school of criticism named in the beginning of our article, and whose unsavory title we would rather not repeat. If we do not join it yet, it may perhaps only be because we are foolishly prejudiced in favour of our own; or because, like other great men, we have our idols and strange gods that seduce us from the true faith. This, however, we will say, that if we thought ourselves likely to be often tempted by such works as Dr. Watson's, we should feel less confident in maintaining our old practice, however we might continue to profess our old principles. But we shrewdly suspect that we are not in much danger of being often so tried. Dr. Watson is too busy with his patients to write us another book soon; and we shall therefore probably go on quietly in the old track, as before,—until again, at some distant day, led into temptation either by him or by some other wise charmer with voice potential as his own.

ART. VII.

Essai D'Hématologie pathologique. Par G. ANDRAL, Professeur de Pathologie, &c. à la Faculté de Médecine, &c.—*Paris*, 1843. 8vo, pp. 186.

Essay on the Pathology of the Blood. By G. ANDRAL, M.D. &c.—*Paris*, 1843.

IN 1840 and 1841, M. Andral read before the Académie des Sciences two memoirs, containing the results of researches on the pathology of the blood, in which he had been assisted by M. Gavarret. These memoirs were subsequently published in the 'Annales de Chimie et de Physique,' tome lxxv, and in tome v, 3e serie, of the same work. The latter memoir was confined to the blood of certain domestic animals in health and disease, the former to the blood of man in the like conditions. The present essay professes to give merely a further development of the facts and ideas contained in these memoirs, without laying claim to be considered a complete work on the pathology of the blood. The new facts are comparatively few. The new essay, and the former memoir on the pathology of human blood, are neither of them distinguished so much by discovery or real novelty of conception, as by the number and apparent precision of the experimental details on some of the most important points on the pathology of the blood; and by the decided manner in which the views are expressed, which the author has conceived to be deducible from his researches. The facts speak for themselves, and will always pass at their own unquestionable value. The conclusions, or we should rather say the theories, also speak for themselves; but many of them will certainly not pass current for any length of time; and indeed some of them cannot be admitted at all. They bear the stamp of M. Andral's customary zeal and quick conception; but they betray, in some respects, a defective acquaintance with facts already ascertained, and an indisposition to view the facts in every possible light, before their meaning is determined.

As our object in the present article is to give the result of the author's researches on the state of the blood in different diseases, we must pass over the introductory part of the essay with very brief notice. It is justly observed that we cannot form a correct notion of the healthy state of the blood in man by what we learn of that fluid in the lower animals; and this truth is enforced by the interesting and well-known fact, that what in man would be considered a morbid state of the blood, in certain animals belongs to the physiological or healthy state. Thus the buffy coat is not a sign of disease in the horse. It is proved to be of quite as much importance that the varieties which may exist in the proportion of the different physical elements of the blood to one another in different persons enjoying good health, should be carefully ascertained; for there is a considerable range for each element between the maximum and minimum in which it may be present in the state of health. M. Andral's researches on the blood have been hitherto confined to the proportion in which the globules, fibrin, solids of the serum, and water, may exist in health and disease. The following is his estimate of that proportion in the former state: the fibrin he considers as existing in the healthy blood

in the mean proportion of 3 parts in 1000. Without any disturbance of the physiological condition, it may be found either so low as 2·5 or 2 per 1000, or as high as 3·5, or even 4; but the two extremes now mentioned are said to be rarely found in health, and should be considered as exceptions dependent on idiosyncrasy. The mean proportion of the globules is fixed at 127 parts in 1000; the extremes in the physiological condition of the system being 140 and 110—the former proportion verging towards the condition of the blood characteristic of plethora. The solids of the serum are estimated at 80 parts in the 1000, and the water of the blood at 790. These mean proportions M. Andral states to be the same as those previously adopted by Lecanu and Dumas, on whose authority it would appear that he has chiefly relied for the proportion of the several elements in question in the normal condition of the economy.

As the importance to be attached to the results of researches, in order to determine whether any, and what, changes occur in the elements of the blood in disease, depends very much on a previous determination of the condition of those elements which is compatible with the state of health, we cannot help regretting that M. Andral does not furnish us in this work with such details, resting on his own authority. If deviations from a healthy condition of the system, even of no very remarkable intensity, be capable of altering the constitution of the blood, the necessity of having ascertained, with scrupulous accuracy, the precise condition of those individuals from whom the healthy standard of the blood professes to be determined, is obvious to all, and we are far from being assured that this amount of accuracy has been attained by those on whose authority so much reliance is placed. The pertinence of this remark will appear sufficiently obvious, when it is considered that chemists fully as well entitled to judge of the medical questions involved in an inquiry of this sort, differ very materially from Lecanu and Dumas in their estimate of the proportion in which the several substances which have been mentioned exists in the blood. Thus, Denis conceives that the mean proportion of globules is 152 per 1000; Letellier that the fibrin ranges between 1·6 and 4·3; Lassaigne fixes it at 1·2; Fourcroy nearly coincides with Letellier, stating its range to be between 1·5 and 4·3. In regard to the serum, a discordance quite as considerable exists; for while Andral, and the authorities in which he confides, maintains that the serum holds 80 parts of solid matter in solution, of which 8 are saline matters and the rest albumen, Berzelius has found the albumen to amount to 80, and the saline and extractive matters to 14; Marcet the albumen to 86, and the other matters to 13. Andral does indeed allow, that in respect to the albumen and other matters of the serum, there are certain varieties in the proportion in which they may occur still compatible with health, but that there is a particular deficiency of albumen which he has never witnessed except in disease, of which more hereafter.

We cannot place any great confidence in the microscopical researches of M. Andral, on the structure and peculiar appearances of the blood-corpuscle; since it is evident to us that he is not sufficiently qualified for the inquiry, either by skill in the use of the instrument, and in the interpretation of the appearances presented by it, or by knowledge of what has been done by other microscopists. Thus we find him maintaining

the extraordinary position, that the well-known granular or mulberry appearance is produced in the blood-corpuscle by the adhesion to its surface of the molecules suspended in the fluid; disregarding the fact that the diameter of the granular or mulberry corpuscles is smaller than that of the normal blood-discs. And we afterwards encounter the completely untenable doctrine, that the fibrin of buffy blood exists in the state of colourless corpuscles, the gradual coalescence of which gives origin to the fibrous network which it is seen to present. It seems very certain that he has committed a serious and unaccountable mistake in having failed to recognize the fibrin as, whatever other form it may assume, existing in the liquor sanguinis in a state of solution, just as albumen does; from which it differs in its property of spontaneously coagulating when in a state of rest.

Plethora. The author commences the pathological portion of his work with an account of the blood of plethora. The common impression is, that in a plethoric state of the system the blood is both richer in its organic elements, and more abundant, than in health. Andral observes, that the latter assertion does not admit of being demonstrated, and he undertakes to prove that the former is true only in a sense restricted to one of the organic elements. We doubt if he is justified in confining the peculiarity of the blood in plethora to a mere alteration of proportion in its elements; for while it is true that we have no means of determining the precise amount of blood contained in an individual at a particular time, which is the objection started by Andral to the assertion that the quantity of the blood is increased, we must, notwithstanding, maintain that there may be sufficient grounds for believing that there is an excess of blood in the vessels, though the exact particulars of that excess cannot be ascertained. A preternaturally turgid state of the vascular tissues, unusual fulness and force of the pulse, feelings of over-distension, constriction, or oppression in the head or chest, and the immediate relief afforded by spontaneous or artificial loss of blood, do appear to warrant the general belief that the quantity of the blood has become, under such circumstances, excessive; and it is scarcely fair to found a denial solely on the ground that the amount of that excess cannot be stated in ounces and drachms. The following is M. Andral's account of the constitution of the blood, to which he would refer all the ascertainable phenomena of plethora:

"Analysis has shown me, in the first place, that it is not true that in plethora, the blood contains notably more fibrin than in any other circumstances; I have found in fact 2·7 of fibrin as the mean proportion of this principle in thirty-one bloodlettings practised on individuals in whom plethora was very marked. Some of them did not yet present notable symptoms; the bloodlettings in them were simply precautions; in the others vertigo, tinnitus, palpitations of the heart, extreme difficulty of breathing, almost apoplectic injection of the conjunctivæ, and of the face, &c., were present. Yet, in these individuals, the fibrin had not attained its physiological mean." (p. 43.)

On this last circumstance, however, he does not insist, but contents himself with affirming that an increase of fibrin is not characteristic of plethora, and that the proportion of it does not, in the majority of cases, attain the highest amount of what has been fixed as compatible with perfect health. In like manner the organic elements of the serum have

been found by him unchanged in their proportion to any remarkable degree.

"The globules then remain, and it is actually the great elevation of their standard which establishes in the blood the character of plethora; on the thirty-one bloodlettings of which I have spoken, I found the mean of the globules to be 141; the minimum 131; the maximum 154. The blood then of plethora differs from ordinary blood by the much smaller quantity of water which it contains." (p. 44.)

This condition of the blood he conceives to be the true and only source of certain phenomena hitherto believed to be dependent upon causes of another kind.

"The individuals whose blood contains a superabundance of globules are subject to certain special symptoms, of which probably no very satisfactory explanation has hitherto been given. Thus, the vertigo, dimness of vision, *tinnitus aurium*, heat of the head, which they experience, have been accounted for by congestions of blood towards the brain; but these congestions have never been, in such circumstances, anatomically established, and the passage of blood having an excess of globules through the vessels of the brain appears to me of itself, a circumstance sufficient to account for the symptoms; but, singularly enough, should it happen, on the contrary, that the globules in too small a number traverse these vessels, analogous effects still occur, so that a quantity of globules, either too considerable or too small, disorders in the same manner certain cerebral functions." (pp. 46-7.)

It must be allowed that M. Andral is very easily satisfied. On what ground is it that he considers the mere passage of a superabundance of globules through the brain as a satisfactory explanation of the phenomena referred to? He does not, and we suspect cannot, adduce a single reason for this belief. We acknowledge that general congestion of the vessels of the brain has not been established by anatomical researches as an actual occurrence, but it does not therefore follow that we are obliged to recognize an excess of globules in the blood as the only alternative cause of the phenomena, as Andral seems to suppose. He overlooks altogether the influence of *pressure* on the functions of the brain, an agency which we think must be admitted to be a far more intelligible source of the disturbances in question. A tight neckcloth, or an inverted posture, will cause both the phenomena mentioned, and an increase of pressure on the brain, but we see no reason to presume that either will produce an increased transmission of the blood globules through that organ. That such an increase of pressure does occur in the case of persons presenting the phenomena referred to, is highly probable from the frequency of the complication of apoplexy with diseases of the heart, in which we know there exists no excess of globules, and from the large quantity of blood not unfrequently witnessed after death from apoplexy in plethoric persons in the integuments of the head, and in the face, indicative of what we must take the liberty of still terming, in the want of a better expression, determination of blood to the head.

Then, as to the production of symptoms of the same sort by an opposite condition of the blood, its deficiency of globules, there are not less valid reasons for conceiving rather that a diminution of pressure on the brain is an adequate cause of such symptoms, than that they depend on poverty of the blood in globules. Witness the effects of a low position of the head in removing the tinnitus, vertigo, and indistinct or troubled vision, which indicate the approach of syncope. That this is the more

probable explanation of the origin of similar symptoms in chronic cases, in which the blood is actually deficient in globules, appears from the circumstance that a posture by which increase of pressure is ensured, operates in the same way on them as on those of syncope. An instructive example of this is afforded by the case related by Dr. Abercrombie of a gentleman who had become anemic from extensive depletion and abstinence, and in consequence was affected with deafness, and in whom the interesting circumstance was ascertained that when he stooped so low as to produce flushing of the face, his hearing became distinct. What arguments or facts can be adduced to render it probable that the condition of the blood in respect to the quantity of the globules affords an explanation preferable to those we have now mentioned, we know not; and in the utter absence of any, we leave the reader to form his own estimate of the naked theory of M. Andral. We do not wish to deny, however, that the blood of plethoric persons is usually characterized by an excess in the proportion of red corpuscles; and the facts stated by M. Andral, in reference to the diminution in the amount of these, always produced by loss of blood, harmonize well with the well-known beneficial effect of bloodletting in this state of the system.

ANEMIA. In anemia, which is next treated of, an opposite condition of the blood exists—it is defective in globules. This state of the blood may originate under various circumstances. Privations, protracted diseases of various kinds, loss of blood, and the constitutional affection which issues in chlorosis, are all liable to induce a greater proportional diminution of the globules than of the other elements of the blood; and sometimes a remarkable diminution of the former without any appreciable decrease of the latter. All this has been long known; but we are indebted to M. Andral for some interesting and precise details illustrative of the facts. He divides anemia into the incipient and confirmed. In the incipient he found the blood in sixteen cases to possess the average amount of globules of 109 parts in the 1000; and in the confirmed he found the average of twenty-four cases to be 65 in the 1000. These were all cases of what he terms spontaneous anemia, and in this form of the disorder, the lowest amount of the globules that he has yet noticed was 28 in the 1000. He conceives it to be of importance to distinguish between the several kinds of anemia, in determining the composition of the blood. Thus, in the spontaneous anemia, whether slight or extreme, he found the globules alone diminished; the fibrin and the solids of the serum maintained their normal standard, the sixteen cases of slight anemia having presented, as a mean of fibrin, 3·0; and the twenty-four cases of confirmed anemia a mean of 3·3. To this head of spontaneous anemia pertains chlorosis, the disorder which affords the most familiar example of the anemic state, when by this term is meant a deficiency of the globules to so great an amount as to reduce the blood to a pale colour. Another kind of anemia is that which succeeds loss of blood, and it may consist of two conditions of that fluid, either of a simple diminution of the globules, which is the first effect of every hemorrhage, or of a diminution also of the fibrin and albumen of the serum. In illustration of the latter, the author mentions an instance of a female who had experienced very abundant hemorrhages from the uterus, and whose blood contained only 21 in the thousand of globules, 1·8 of fibrin, and

61 of solid matters of the serum, the proportion of water having amounted to 915. Anemia may also be the result of certain appreciable modifications of the organism which exerts an influence on the blood. In that case the composition of the blood is the same as in spontaneous anemia, the globules only are diminished. Examples of it are furnished by the blood of pregnant females, in whom the blood loses some of its globules without parting with any of its fibrin. The average of the globules in pregnancy was found to be the same as of incipient spontaneous anemia, 109. Though females are much the most liable to anemia, for reasons with which we are quite unacquainted, it is yet well known that anemia in any of its forms may occur in males also, the spontaneous occurring with all the symptoms which characterize chlorosis in the female, and with an alteration of the blood of exactly the same sort, a decrease in the globules alone. In the cachectic state which follows the prolonged influence of lead, M. Andral has found the same condition of the blood as in the spontaneous anemia, the fibrin and solids of the serum remaining in their normal proportions.

Examined by the microscope, it has appeared to the author, in two cases of chlorosis, that the globules had become much smaller than ordinary, and, at the same time, had no longer their accustomed figure; they were apparently broken, and diffused in the form of fragments over the field of the microscope. This aspect of the globules ceases as the chlorosis becomes cured, and the author has had occasion to notice the normal characters of the globules thus restored, two months after they had exhibited the alterations in question, the patient having passed from a chlorotic into a state of actual plethora within that period.

It has been long known that the blood, in chlorosis, is liable to present a buffy coat, the reason of which is thus stated by M. Andral:

"It is because the blood of the chlorotic has poisoned all its fibrin, and has lost part of its globules; and consequently there is actually in the blood, as in that of inflammations, or as normally in the blood of certain animals, an excess of fibrin in relation to the globules; now, whenever this excess occurs, whether it be relative or absolute, when at the same time the coagulation of the fibrin is not correspondingly rapid, we perceive this substance accumulate at the surface of the clot, and the buffed appearance to be produced. Hence the reason why the blood of anemic persons may be buffed, and that of the plethoric is not; hence, also, the reason why in the former the crassamentum is more firm and dense than in the latter." (p. 35.)

In reference to the functional disorders which accompany anemia, he states that they correspond in intensity to the degree of diminution in the number of the globules; and he labours especially to prove this, in regard to the murmur which is heard in the heart and arteries. The following are the deductions which he draws from his observations on this subject:

"1. When the globules are so few as to be below 80, the bellows-murmur exists in the arteries as a constant occurrence. I have not found a single exception to this law.

"2. When the globules are above 80, the murmur may still occur, but it is not constant; we continue to hear it pretty often when the globules range between 80 and 100; it happens still, but much less frequently, when the globules exceed 100; and we never observe it, allied at least to an alteration of the blood, when the amount of the globules is elevated above its physiological mean.

"Whatever, in other respects, may be the nature of the disease in which the

diminution of the globules exists, the bellows-murmur in the arteries does not the less occur. I have found it in cases of the most different characters, putrid and eruptive fevers, pneumonias, articular rheumatisms, and in a great many chronic maladies. But, in all these cases, it happened only in connexion with the state of the globules indicated above." (pp. 57-9.)

He adds, that the murmur occurs pretty often in pregnant females, and in connexion with the diminution of the globules frequently found in them; and further, that the intensity of the murmur is generally proportional to the degree of decrease in the globules. Thus, in 22 cases of chlorosis, he found the murmur intermittent 8 times, the amount of globules ranging between 117 and 77; and the murmur continued 14 times, the amount of globules ranging between 113 and 28.

Beyond the statement of these particulars M. Andral does not go; and by thus stopping short, we conceive that he leaves the discussion of the source of the chlorotic murmur in an unsatisfactory state. The hypothesis, that the condition of the blood is the only one on which the murmur depends (and this seems plainly the inference to which the writer points,) appears irreconcileable with some of his own statements. The whole scope of the observations in respect to the murmur of the arteries bears simply upon the general fact, that whenever the murmur existed the globules were found diminished; but in order to have established the dependence of the murmur on that diminution he ought to have proved the converse also, that whenever the globules were in like manner diminished, the murmur existed: this, however, is not attempted, excepting to the extent contained in the first of the two rules quoted above. It may also be objected, that, in cases of confirmed chlorosis, there are other alterations in the blood, besides diminution of the globules. This appears from the researches of M. L'Heritier,* who affirms, upon the basis of a series of experiments that seem to have been much more extensive (on this point at least) than those of M. Andral, that *all* the solids of the blood are diminished in such cases.

What we consider of especial consequence in the observations of M. Andral, in reference to the relation between the arterial murmur in chlorosis and the amount of the globules, is, that if the existence of the murmur, and more particularly of its intensity, is adopted as an indication of the degree of the diminution of the globules, and consequently of the state of advancement which the disease has reached, it will be apt to mislead; for though tenuity of the blood is granted on all hands as affording a facility for the generation of the murmur, it is very certain that other causes powerfully concur in its production; and according to their accidental and even temporary intensity the murmur may vary in different cases, irrespective of the amount of change in the elements of the blood. We refer the reader to Dr. Hope's chapters on "Inorganic Murmurs," for most conclusive arguments in favour of the doctrine, that the rate at which the blood moves in the arteries has very much to do with the production and degree of the anemic or chlorotic murmur.

In concluding this chapter on the diminution of the globules, M. Andral takes occasion to notice that he has not found any decrease of temperature attendant on the deficiency of globules. Even when the

* Traité de Chimie Pathologique, pp. 249-50.

globules were as low as 21, he found the temperature in the axilla vary from 37° to 38° (cent.); and when febrile action became established in such cases the temperature rose as usual.

FEVERS. The next article, on the blood in fevers (pyrexiæ,) we consider the most valuable—in so far as the author's own researches are concerned—in the whole work. It derives its value in an eminent degree from the contrast which its details present to those contained in the article which follows, on the blood of inflammations. We extract the first two paragraphs entire, containing, as they do, a succinct, luminous, and not less truthful expression of important pathological views of the class of diseases to which they refer.

"The *pyrexiæ* form a grand class of acute diseases which vain attempts have been made to blot out from the tables of nosology, in order to rank them in the order of inflammations. Such an attempt ought not to be encouraged; the pyrexiæ exist as distinct diseases, (*maladies à part,*) the causes which often develop them, the symptoms which characterize them, the special nature of the alterations which they effect on the solids, the epoch of development of these alterations often posterior to that of the febrile action, are so many serious reasons for not confounding them with inflammations; but analysis of the blood tends besides to establish a difference, the most remarkable between the one and the other class. The results furnished by this analysis have something so marked, that they seem to me to determine in a definite manner the distinction, vainly opposed, of fevers and inflammations; it is this which I proceed to demonstrate.

"Whilst in inflammations, there are always two constant alterations which advance together, that of a solid and that of the blood, there is nothing of the kind in fevers; in these diseases indeed, the only phenomenon which is never wanting, is the fever itself; the alterations, various besides, of which the solids are the seat, may be completely absent, neither do the changes of composition which analysis has discovered in the blood, show themselves in every case; so that in the actual state of our knowledge, the character of fevers remains still a negative one; that is to say, that, to the best informed, the fever, which accompanies the *pyrexiæ*, does not acknowledge either in the solids or in the blood, any alteration which can account for it. At the same time, in the solids and in the blood, we can more or less frequently discover alterations; but they are only the effects of a cause more sudden which reigns in the system, effects, nevertheless, which it is important to study well, since in their turn they become themselves the cause of a certain number of symptoms, and because by their seat and nature they serve to class and to denominate the *pyrexiæ*." (pp. 61-2.)

The general fact of there being a tendency throughout the progress of fevers, to a reduction in the solids of the blood, we need scarcely observe, has been long known in this country. The observations of Dr. Reid Clanny on this subject, imperfect though they be, may be noticed as having pretty generally diffused among us a belief that such is the constitution of the blood in continued fever; but M. Andral's researches have brought to light not a few additional facts of much importance and interest, and have placed the whole subject on a very different footing, in regard to precision and pathological value, from that in which he found it.

It is doubtless well known to our readers that in inflammations the proportion of the fibrin of the blood is increased in relation to the globules. Now in fevers, the very opposite condition is exhibited, to this extent at least, that the fibrin invariably decreases, and even though the globules do so to a considerable amount, at the same time their proportion to the fibrin in the diminished state of both, is always much greater

than in health. In the early stage of the fever it sometimes happened that the difference in the relation of the two elements to one another was rather owing to the increase of the globules than to the degree of the diminution which the fibrin had actually undergone. Thus the blood in some cases exhibited an increase of globules to between 130 and 149; but in general, and always in the advanced periods of the fever if uncomplicated, the difference was due to the decrease of the fibrin. This tendency to the decrease of the fibrin in fevers is arrested in the event of intercurrent inflammation, though the ensuing increase of the fibrin, (for it may rise in the course of these intercurrent inflammations,) is never so considerable as when the inflammations occur independently of the fever. And it is most interesting to notice that the occurrence of those specific inflammations which are proper to, and characteristic of the fever, has not the effect of thus augmenting the fibrin. The pustular inflammation in smallpox, the inflammatory efflorescence on the surface in measles and scarlet-fever, are not accompanied by an elevation of the fibrin above the natural standard. In smallpox, as appears from his former memoir, M. Andral found the proportion of fibrin, only once somewhat elevated, but even then the total amount was 4·4, scarcely, if at all, beyond the maximum limit of health; and the common range of it was from 3·5 to 2; yet in one case it had fallen so low as 1·1. Something like the ordinary effect of inflammation was noticed occasionally in smallpox; thus when a first bleeding had discovered a low proportion of fibrin, a second practised while the disease was still advancing, has discovered an increase on the former proportion. In one case, for instance, a first bleeding revealed the proportion of fibrin to be 1·1, a second to be 2, and in another case the increase was from 2·6 to 3·5. In both these instances, the progress of the change was, as in simple inflammations, but the energy of the cause, whatever it may be, which accomplishes in inflammation the increase of the fibrin, seems to have been too feeble in these cases of smallpox to overcome the peculiar influence which has the power in fevers of depressing the proportion of that element of the blood.

INFLAMMATIONS. In the fourth article the changes which the blood undergoes in inflammations are described. M. Andral's researches on the effect of inflammation on the blood, are interesting chiefly on account of the details which he furnishes of the amount to which the fibrin may increase in different inflammatory affections. It is scarcely necessary to mention that the most characteristic alterations which the constitution of the blood undergoes in inflammation consist of a gradual decrease in the proportion of the globules, and an increase in that of the fibrin. The albumen of the serum too, sometimes, but not always, has been found affected, the tendency of the inflammatory process being to increase the amount of it. It was in acute articular rheumatism, and in acute pneumonia, that the greatest increase of the fibrin was discovered. The mean increase in these two diseases fluctuated between 7 and 8 parts per thousand; the extremes were 4, and 10·5. In acute bronchitis, pleurisy, peritonitis, tonsillitis, erysipelas, and other inflammations, the operation of the general law was abundantly manifest; but in none of these did the increase of the fibrin reach the same amount as in the two diseases we have specified: the common augmentation in the other affections having

been 5 and 6 parts only; and the highest amount did not exceed 9·3; an elevation which was noticed only once, and that in a case of acute bronchitis.

The following is a summary of the results obtained in the experiments on the blood of inflammation.

"First, since inflammation of the cellular tissue is regarded as the type of inflammation generally, I shall speak of a case of phlegmon of small extent affecting one of the legs, which terminated in ulcers, and which was accompanied with but a slight febrile movement. In a first bloodletting we found the fibrin 4·7, and in a second 5. In another case of phlegmon, which existed in the mamma, and which terminated by resolution, the blood furnished 4·5 of fibrin during the continuance of the slight inflammation, and 3·7 only, some time after it had terminated.

"Among 84 bloodlettings practised during the course of well-marked pneumonia, there were 7 only in which the fibrin fluctuated between 4 and 5; in the 77 others it surpassed this amount, maintaining itself eleven times between 5 and 6, nineteen times between 6 and 7, fifteen times between 7 and 8, seventeen times between 8 and 9, nine times between 9 and 10, and six times elevating itself to 10, or exceeding a little this last degree.

"In inflammations of the mucous membranes we found the fibrin retaining its normal quantity if these inflammations were slight, of small extent, and without fever; but whenever they had a certain degree of intensity, and when febrile action accompanied them, the fibrin invariably increased.

"Thus I have seen it attain the amount of 6·7 and 9 in cases of bronchitis which had much extent and acuteness.......... In inflammations of the mucous membrane of the digestive passages, the same increase occurred." (pp. 86-7.)

M. Andral states, however, at p. 70, that, though whenever a portion of the digestive mucous membrane, "from the fauces, including the tonsils to the end of the colon, is seized with the inflammatory process sufficiently acute to produce fever," there is a notable increase of the fibrin; yet the elevation amounts only to 5, 6, or 7, and never higher.

Having found in four cases of mercurial stomatitis the occurrence of the same condition of the blood as in the simple, or non-specific inflammations, M. Andral remarks—

"Thus mercurial stomatitis, notwithstanding its specific nature, does not differ from ordinary *phlegmasiæ* in respect to the influence which it exerts on the blood; and yet it is often averred that mercury introduced into the economy has the effect of producing in the blood a state of dissolution, which cannot exist with an augmentation of fibrin. It is possible that this may occur after a prolonged employment of this medicine, but it certainly does not during the earlier periods of its administration. Consequently, when it is given to combat certain acute inflammations—peritonitis, for example—one is not entitled to admit that its antiphlogistic action depends on its creating in the blood a disposition the reverse of that which coincides, in that fluid, with the existence of a state of inflammation." (p. 90.)

As long as acute inflammation continues unabated the elevated proportion of fibrin remains unchanged, notwithstanding repeated bloodlettings and the most restricted diet. And, indeed, so constant and powerful is the agent which augments the fibrin in inflammation, that no circumstances of previous debility, or privation, present the characteristic change. This is remarkably exemplified by the results of certain researches of the author, on the effects of starvation on the blood of dogs. He was surprised to find that after a time the fibrin had actually increased in amount, but, he adds, "I ceased to be surprised, when, on examining the bodies

of these animals, I found alterations in their stomach of the most decidedly inflammatory nature; such as lively redness, softening, and numerous ulcerations of the mucous membranes of the viscus." By bloodlettings, practised before they were deprived of their food, he found in three dogs the fibrin to amount to 2·3, 2·2, and 1·6, respectively, being the natural range of the fibrine in those animals. The first dog was starved for twenty-one days, after which he died. When bled on the seventh day, the fibrin was found to have risen to 3·9, and on the fourteenth day to 4·5. The second was allowed some water only, and died in eighteen days; on the seventh day the proportion of fibrin was found to be 2·9; and on the fourteenth 4·0. The third animal lived twenty-six days, having been supplied every morning with a very small ration of soup. The blood, on the seventh and fourteenth days, exhibited no considerable change, the fibrin having increased only to 1·8. But on the twenty-second day, when the insufficient nourishment had an opportunity of affecting the economy for a longer time, it was far otherwise, for then the blood showed an increase of the fibrin to 3·3. In this instance, the amount of disease in the stomach was less considerable than in the others. (pp. 82-3.) These facts, concerning the state of the stomach in animals long deprived of food, accord with what Hunter conceived to be the effect of starvation on that viscus. The increase of the fibrin is confined to acute and subacute inflammations, is considerably less in the latter than in the former, and does not occur at all in chronic inflammations.

The elevation in the quantity of the fibrin appears in the blood from the very commencement of the inflammation. M. Andral has had occasion to bleed on the morning of the day in which inflammation began, before its actual invasion too, and again a few hours after the process had begun; and in the blood of the former evacuation he has found the fibrin in its normal quantity, or that of the latter in excess. "Hitherto," he says, "I have endeavoured in vain to determine whether, before the change which denotes the inflammation had appeared in the solid textures, the blood had not become modified in its composition. I have not been able to establish this; and my analyses have not yet shown me anything else than the simultaneous origin of these two conditions." (p. 98.) He conceives, however, that the question is not yet decided; and hints that the very dissimilar circumstances in which inflammations commence, leave room to doubt whether the starting-point of the inflammation is the same in every instance. What occurs in the case of a burn clearly proves that it is consequently to an alteration of the solids that the blood, in that instance at least, becomes modified in its composition; and, he adds, that, inductively considered, we should suppose it to be the same with other inflammations,—a conclusion which the analyses hitherto made of the blood tend to confirm. The connexion which the inflammatory fever has with the increase of the fibrin appears to him also a matter for further inquiry;—he seems in the text to be struck with the coincidence between the increase and diminution of the former with those of the latter, and yet, in a note acknowledges the impossibility of explaining thus the phenomena of fevers in general. The coincidence is, he might have added, deprived of much, if not of all, of its apparent significancy, by the fact that the conditions of the fibrin and of the fever

are intimately related to the extent and intensity of the local inflammation. On this point, however, it must be granted that sometimes the phenomena of the fever are actually present before the local symptoms of the disease have occurred; and are probably therefore occasionally due to the general operation of the cause which, in its ulterior effects, superinduces the local affection. It would be interesting to learn whether in such cases, and before the occurrence of the local disease, the fibrin is actually increased: we know that a buffy coat on the blood is not at that period a characteristic or usual appearance. Again, every physician has met with cases in which the fever has continued, although the blood has ceased to exhibit the buffy coat, and that too in acute inflammation; and M. Andral, at p. 94, records a case of peritonitis which had passed from the acute into a somewhat chronic state, without, however, the fever having ceased for an instant; and yet the fibrin had fallen to 3·5.

In reference to the buffy coat, M. Andral recognizes three conditions which may favour its occurrence;—a great decrease of the globules while the fibrin remains undiminished; an actual increase in the quantity of the fibrin; and a slower coagulation of the blood. The first is the cause to which he assigns the occasional occurrence of the buffed appearance in the blood of chlorosis, in which the globules, in consequence of their diminished number, have a facility for subsiding, and thereby leave the fibrin free to rise to the surface of the crassamentum. The last two he conceives to be the causes of the buffy coat of inflammatory blood. He has completely overlooked another and, perhaps, a more important reason of the buffy coat of inflammatory blood,—the unusual tendency of the globules and fibrin to separate. This is a fact so well ascertained that the omission of all notice of it is not a little singular. More than twenty years ago Dr. John Davy directed attention to the fact, that in inflammatory blood the separation of the fibrin from the red globules may be noticed to occur within the time usually necessary for the coagulation of healthy blood; that, in fact, it may be witnessed in the form of a supernatant liquid stratum within one or two minutes after the blood has been drawn. Schroeder van der Kolk, too, has conclusively demonstrated the same fact; and besides drew, long ago, attention to a remarkable proof of this tendency of the globules and fibrin to separate early, which is exhibited when the blood is spread in a thin layer either on the lancet or any other flat surface. The appearance which is then presented is quite characteristic of inflammatory blood, and proves a disposition in the globules and fibrine to separate altogether, irrespectively of the influence of the gravitation of the globules. The thin layer in question speedily presents a mottled or areolar aspect, due to the red globules being grouped in particles and lines, having the transparent liquid fibrin interposed. Microscopic examination of the habitude of the red globules of inflammatory blood, immediately after it is drawn from a vein, explains the manner in which this appearance is effected. We must refer to Mr. Wharton Jones's Report in our Number for October, 1842, for details connected with this and some other interesting particulars concerning the blood of inflammation, and at present content ourselves with stating, that the globules appear in such blood to have an increased attraction for one another, and that they accumulate almost

immediately, on coming into a state of comparative rest, into nummular piles or strings,—an arrangement which of course amounts to a cessation of their state of intermixture with the *liquor sanguinis*. We are aware that it has been supposed that the mottled aspect of the blood in question is owing rather to a repulsion between the globules and the fibrin, but of this there is no proof; while of the increased attraction of the globules for one another there is ocular demonstration.

PREGNANCY. In connexion with the account of his researches on the blood of inflammation, M. Andral notices the influence of utero-gestation in elevating the proportion of the fibrin. Having analysed, with M. Gavarret, the blood of thirty-four pregnant females, he has found that from the first to the end of the sixth month the quantity of the fibrin is always below the physiological mean; the mean proportion of the fibrin during these six months having been 2·5; its minimum, 1·9; its maximum, 2·9. But, during the last three months of pregnancy, the mean of the fibrin was found above the physiological standard; it approached 4, and presented a maximum of 4·8. In the last month of pregnancy the increase of the fibrin appeared to have attained its greatest amount, the mean having been 4·3. To this increase of the fibrine, along with the diminution of the globules, he ascribes the occasional occurrence of the buffy coat on the blood of pregnant females. The diminution of the globules is so general, that, among the thirty-four females, he found these bodies to range between 120 and 95 in twenty-six cases; and between 125 and 120 in six others.

"The blood then manifests a remarkable tendency to assume the character of the blood of inflammations, and without doubt we have to reflect on the relation which may exist between the kind of modification which the blood then undergoes, and the development of those special accidents—generally of an inflammatory appearance—which affect so often females recently delivered. Ought we to regard the slight excess of fibrin which, in them, exists in the blood, as a predisposing cause of these accidents?" (p. 104.)

This question, in connexion with the general one of the changes which the blood undergoes previously to the actual occurrence of inflammation, he will soon endeavour to determine.

ACTION OF PUS ON THE BLOOD. Few of the author's observations on pus are worthy of being specially noticed. The following are, however, of some interest:

"I have ascertained, by experiment, that on mingling pus directly with blood, the latter undergoes no appreciable alteration either in its aspect to the naked eye, or under the microscope, or in its quantity of fibrin, if the pus be still fresh. But it is otherwise if the pus mixed with the blood have existed a long time out of the body, and have already undergone a certain degree of decomposition." (p. 117.) [He mingled the latter sort of pus with the blood of a case of acute articular rheumatism, the pus being in the proportion of one tenth of the mixture.] "An hour after the mixture had been made I found the clot well formed, but without the buffy coat, and surrounded with a transparent serum. The pus, putrefied as it was, appeared then to have no particular action on the blood, if it be not that it opposed the formation of the buffy coat; it had not altered its consistence. But at the end of twenty-four hours matters were much changed; the vessel was then filled with only a liquid matter, red, and similar to that which is obtained by a mixture of blood and ammonia. . . . . . Examined by the microscope, the liquid mass presented no longer a trace of blood-globules, but a great many globules of pus were found; so that the putrefaction had not destroyed these." (p. 119.)

"It results obviously, from these experiments, that the influence which the pus exercises on the blood is far from being the same, according as the pus is fresh, or has existed so long out of the living body as to have become putrid. Fresh pus has no appreciable action on the blood; putrid pus acts on it in the same way as ammonia does; it destroys at once the globules and the fibrin. But, what is remarkable, this destruction does not happen immediately; and it is necessary that some hours should elapse of contact between them before the blood begins to present traces of alteration." (p. 120.)

Hence the author concludes, that when pus circulates in the blood the effects on this liquid will depend on the qualities of the pus; and that it is not, in the event of pus altering the blood, its globules but the ammoniacal product which is formed at the expense of the pus itself, which acts injuriously on the blood. He also concludes that it is this ammoniacal product which is transferred on the scalpel from putrefying bodies, and causes those changes which are noticed in the blood, and those symptoms which follow, when punctures have been received with the poisoned instrument; symptoms of the same sort as those which are produced by admission of pus, in certain states, into the circulation. In short, it is to this product that he ascribes the typhoid symptoms which supervene under these circumstances; and the absence of the usual effect of inflammation, when this happens to be present at the same time, or of the fibrin, is ascribed to the operation of the same agent.

HEMORRHAGE. The fifth article, on the state of the blood in hemorrhages, is a long one, but, as much of it is occupied by references to authors, and reasonings in favour of a certain view which the author entertains of the nature of the blood in this morbid condition, what we have to notice, as comparatively new and interesting on this head, admits of being very briefly stated.

"The diminution of the fibrin in relation to the globules is the grand condition of the blood which favours the production of hemorrhages; the relation of these two facts is so constant, that it appears to me impossible not to regard the one as the cause of the other. And that it need not be maintained that it is the hemorrhage which produces in the blood the diminution of the fibrin, it suffices to observe, that it is necessary that the loss of blood should be very abundant in order to produce this effect, and that I have seen the fibrin diminished in these cases, when the quantity of blood lost could certainly not account for it. I add, as an argument which seems to me unanswerable, that if it were the hemorrhage which produced a change in the composition of the blood, we should certainly find the globules diminished in a proportion yet greater than the fibrin; but this not only does not occur, but the globules are the most commonly then in excess compared to the fibrin." (p. 127.)

He mentions two states, of a different kind, in which the law still holds good of a diminution of the fibrin in relation to the globules, which may favour the production of hemorrhages. In the one the only change occurs in the globules, which have become elevated above their normal amount, and hence the hemorrhages of plethora. In the other the fibrin alone is essentially altered, and has become less abundant than usual. This is the condition of the blood in scorbutus. He mentions an instance in which he had an opportunity of examining the blood of scorbutus. The trunk, the face, and the limbs were covered with petechiæ, and large ecchymoses; the gums were soft, swelled, and bleeding, and epistaxis occurred from time to time; the pulse was 60, the head was affected with a sense of weight and vertigo. The blood which was drawn contained

119 of globules, 86 in solids of the serum, and only 1·6 in fibrin. It was not in cases of the general hemorrhagic tendency only that he ascertained the diminution of the fibrin, but also in cases of cerebral hemorrhage.

"Whether the blood escape from several solids simultaneously, or from one only, facts lead to the conclusion that in the second case, as well as in the first, there are hemorrhages which may depend on this,—that the blood, deprived of its normal quantity of fibrin, has lost, by that circumstance, a part of its plasticity; and thus we come to recognize, in an alteration of the blood, the *point de départ* of certain morbid phenomena, the cause of which is the most commonly ascribed to a lesion of the solids. The cases in which the fibrin is only diminished in reference to the globules which are in excess, belong, from their symptoms, to the cases of hemorrhage termed active, and the cases in which the quantity of the fibrin is actually diminished belong to those of hemorrhages termed passive. The attentive study of the alterations of the blood comes, then, to afford a new support to this ancient division, which contains theories we could not admit, but which could not be overlooked by the principles of treatment, or by clinical observation." (p. 134.)

In his memoir, in the 'Annales de Chimie,' M. Andral conjectures that in *purpura hemorrhagica* the fibrin will be found on examination to be very scanty, and the close analogy between that disease and the one he describes as *scorbutus*, renders it probable that the blood in both will hereafter be found to be of much the same characters. The hemorrhages in both have been long conceived to depend on a change in the fibrin, and the opinion would claim assent, were it not that certain observations made by most respectable authors, have furnished facts which are utterly irreconcileable with it. Thus Deyeux and Parmentier found in three cases of *scorbutus* the blood about as rich in fibrin, and the clot as consistent, as in health; the late Dr. Parry, of Bath, found the blood in two cases of purpura, to form a firmly contracted coagulum, covered with a buffy coat; and Dr. Babington, too, in a case which presented many of the symptoms of that disease, or of sea scurvy, found the blood of a like firm character, and also surmounted by a buffy coat. Doubtless, M. Andral would endeavour to get rid of all these cases, as he actually does of the first three, by contending that the amount of fibrin was owing to some intercurrent inflammation. But, allowing the fact to be so, it is not the less a serious objection to his doctrine of the dependence of the hemorrhages on a deficiency of the fibrin; for from whatever source the fibrin was derived in these cases, it was present in, at least, its normal proportion; and in the cases of Parry and Babington, probably in excess; yet, notwithstanding, the hemorrhages occurred. The subject therefore manifestly stands in need of additional investigation.

Dropsy. The facts relating to the blood in dropsies, may be divided into those which are negative and those which are positive. M. Andral passes in review the influence of diminution of the fibrin and then of the globules, in producing dropsical effusions, and finds that neither has any direct concern with their manifestation. If a deficiency of the globules were adequate to the production of dropsy, that symptom would doubtless be common in chlorosis, which it certainly is not: and if a decrease of the fibrin were capable of leading to dropsical effusion, we should expect to find this occurrence in scorbutus and purpura and typhoid fever. Yet there is one condition of the blood, he conceives, which we have a right

to regard as entailing necessarily the occurrence of dropsy; namely, a diminution of the albumen of the blood. Those who are acquainted with the researches of Drs. Bostock, Christison, and Babington, do not need to be informed that in Bright's disease of the kidney, when the albumen is present in any considerable quantity in the urine, it is proportionally defective in the serum of the blood, and it is in that disease alone, and dependent on the cause in question, that M. Andral has satisfied himself of the intimate connexion between the deficiency of the albumen and the occurrence of dropsy. The occurrence of the dropsy in the acute stage of the disease, when none of the ingredients of the blood are deficient but the albumen, appears to favour this view of the source of the serous infiltrations, in preference to that of Sabatier and Solon, who ascribe it in general terms to the tenuity of the blood considered as a whole,—a condition of it, however, which is confined to the more advanced periods of the disease. Dr. Christison suggests, that in the acute stage it is the deficiency of the albumen which constitutes the condition on which the dropsy depends; while he seems to concur with the authors mentioned in ascribing the infiltrations of the advanced periods to the general deficiency of solid matter in the blood. But if the deficiency of any of the ingredients of the blood is to be regarded as the cause of the dropsy, it must be that of the albumen; for in other respects the blood in this disease of the kidney, in so far as the amount of its natural organic elements is concerned, has precisely the same constitution as the blood of chlorosis, with the single exception that it is also deficient in albumen, which, according to Andral, does not occur in chlorosis. These facts seem to justify the opinion that it is essentially on the deficiency of the albumen that the dropsy depends in Bright's disease. And yet, with all this appearance of proof in favour of the influence of a diminution of the albumen, we should be sorry that further inquiry should be foreclosed by a general acquiescence in this doctrine—and for various reasons. In the first place, because it is well known that in not a few cases dropsy never supervenes, although the amount of albumen in the urine demonstrates that there must be a great deficiency of it in the blood. Secondly, because the deficiency of albumen in the blood is but one of the alterations which this liquid undergoes in disease of the kidney; and, indeed, it is when the albumen is most deficient, i. e. in the acute stage, that other suspicious alterations are the most likely to exist in their greatest degree, namely, the accumulation of those matters, urea and salts, which are not evacuated with the urine in nearly their natural quantity. And, thirdly, because the degree and extent of the dropsy has not been found to have any direct relation to the degree of the coagulability of the urine, that secretion being sometimes found but slightly coagulable when the dropsy is very great, and, as already stated, sometimes absent altogether when the urine abounds in albumen. We do not think that sufficient attention has yet been bestowed on the amount of the salts of the serum, in dropsy from diseased kidney; and this is the more to be regretted, because it is quite a supposable circumstance that their accumulation in the blood may have some influence on the secretion of the various tissues by their stimulant properties. We have sometimes, also, ventured to ask ourselves the question, whether the great proclivity to inflammatory ac-

tion which obtains in this disease may not be owing in some measure to this state of the blood.

It is not certain that other conditions of the blood, besides those which occur in cases of diseased kidney, may not be sometimes the sources of dropsy; such, more especially, as result from long-continued privation of nutritious aliment. M. Andral conjectures that in such cases also the albumen of the serum becomes ultimately lessened, and that the deficiency constitutes the pathological condition on which the dropsy depends,—an opinion which he thinks is supported by what occurs in sheep which have been long kept in moist localities and insufficiently nourished. Under these circumstances the albumen of the animals' blood was found to have become lessened, at the same time that the animals became hydropic. We have no details, however, from which to judge of the force of this argument, or of the exact nature of the pathological circumstances in which these animals were found.

ORGANIC AND NERVOUS DISEASES. The two short chapters on the blood of organic and nervous diseases, contain little that is worthy of notice. The general tendency of chronic diseases is to lessen the amount of the globules, thereby producing the anemic aspect characteristic of most of those which materially affect the health. The fibrin is always liable to increase on the supervention of inflammatory action, but is in other circumstances not apt to have its ordinary proportions materially disturbed.

ART. VIII.

Views upon the Statics of the Human Chest, Animal Heat, and Determination of Blood to the Head. By JULIUS JEFFREYS, F.R.S. &c.—*London*, 1843. 8vo, pp. 234.

MR. JEFFREYS is very generally known to the profession as the ingenious inventor of the "Respirator." He is the author of various scientific memoirs of merit, and, among others, of an interesting series of papers on "artificial climates," which appeared in the Medical Gazette, (1842, Nos. xxii to liii.) The work before us contains an exposition of those views of the physiology of respiration, which, among other practical results, led to the construction of the instrument referred to. It contains also the views of animal heat, and of determinations of blood, which the author has been led to adopt; illustrated by a number of interesting observations and reflections made during a long residence in tropical climates. These refer chiefly to the effects produced by the peculiar habits of different nations in respect to their food and clothing; to the phenomena developed during remarkable states of the atmosphere as regards its temperature, moisture, and density.

Part I is devoted to the statics of the chest. The author divides the air of respiration into four quantities: 1st, the *residual air*, or that which cannot be expelled from the lungs, but remains after a full and forcible expiration; 2d, the *supplementary air*, or that which can be expelled by a forcible expiration, after an ordinary out-breathing; 3d, the *breath*, or tidal air; and 4th, the *complementary air*, or that which can be inhaled after an ordinary inspiration. The volume of these four quantities, Mr. Jeffreys estimates as follows;

Residual air	120 cubic inches.
Supplementary ditto	130 „
The breath	26 „
Complementary air	100 „

This estimate gives 250 cubic inches as the average volume which the chest contains after an ordinary expiration, consisting of residual and supplementary air, and constituting, together, what Mr. Jeffreys denominates the *resident air*. The estimate of the first quantity is that of Dr. Bostock. The estimates of the supplementary air and of the breath differ somewhat from those which have been stated by other observers. The supplementary air was estimated by Jurin at 220, and by Dr. Bostock at 160 or 170 cubic inches; by John Bell, on the other hand, it was computed to be as low as 70. From the very careful experiments of Dr. Menzies, the volume of the *breath* was estimated by him to average 40 cubic inches; an estimate which Mr. Jeffreys justly ascribes to the fact that the observations were made under circumstances which induced laborious breathing, and which was therefore too high. The observations of Mr. Jeffreys on this point appear to have been made with much care and judgment, and probably approximate as nearly as can be expected to the truth.

The author takes considerable credit to himself for pointing out that the air of respiration, or the breath, can have no *direct* concern in the oxydation of the blood, that it can only renew in part the resident air, and by gradual admixture with it, during successive respirations, ultimately reach the air-cells. He asserts that physiologists have always spoken of the *air of respiration* as acting directly upon the blood in the air-cells, and of it, "when breathed out, as having given up a portion of its oxygen to the blood, and having received from the blood, carbonic acid and watery vapour."

Without detracting at all from the merit of Mr. Jeffreys for the clear and accurate description which he gives of the mode in which the ventilation of the lungs is carried on, and for the important bearings upon the physiology and pathology of the respiration which he points out in connexion with these facts, we cannot admit that physiologists have been guilty of the error attributed to them. The air of the breath has been experimented upon, and regarded only as affording an estimate of the average changes which must take place in a given time in the lungs, and may have been, for the sake of brevity, talked of as if it were the direct and immediate agent of arterializing the blood; but in the words (e. gr.) of Majendie, "the portion of air expired is not exactly that which was inspired immediately before, but a portion of the mass which the lungs contained after inspiration;" and, "inspiration and expiration are intended to renew in part the considerable mass of air contained by the lungs."

The theory of animal heat adopted and illustrated by Mr. Jeffreys is that of Crawford, as modified by Lavoisier. From a consideration of the diet of the inhabitants of the tropics, he concludes that a much greater quantity of heat would be generated in their bodies, than could possibly be got rid of in the high temperatures and moist atmospheres to which they are exposed. From this he infers that the manner and intensity of

the union of carbon and hydrogen with oxygen, to form carbonic acid and water, must be regulated by the vital powers in such a manner as "to yield very different quantities of heat at different times." (p. 78.) This conclusion we fear, if it follows necessarily from the premises, only proves the insufficiency of that theory of animal heat which requires to be so propped up.

Our author's theory of animal heat leads him into some curious speculations on the sources of nutrition. Conceiving that in herbivorous animals in hot climates, and in the rice-eating Hindoo, the non-nitrogenous principles of their food would be insufficient for the renewal of their animal fabrics; and that at the same time, to obtain the little azotized matter which it can afford, they would be compelled to consume an unmerciful quantity (considering the heat of the climate) of fuel in the "heat-producing carbon and hydrogen" of their vegetable food; he comes to the conclusion that the nitrogen of the atmosphere is laid hold of by the vital power, and by its means the non-nitrogenous principles of vegetable food are *assimilated.* This hypothesis, ingeniously as it is advocated, calls for more evidence than has been advanced in support of it in the work before us. But we think, on the other hand, that the doctrine of Liebig cannot be regarded as by any means satisfactorily demonstrated; and that many of the objections urged by Mr. Jeffreys should be weighed better than they have yet been, ere we assent to the principle, that no conversion of a non-azotized to an azotized compound ever takes place in the animal body. That this conversion, however, if it should be demonstrated to take place, is effected by any other than *chemical* agency, we cannot by any means admit. Much as we respect the "vital power," we have our doubts of its ability to do several things attributed to it in the work before us. While we protest, as we have always done, against the too-prevalent error at the present day of regarding the human body as a mere laboratory or machine, we would guard equally against resuscitating, for the sake of an hypothesis, the *vis medicatrix naturæ* of former times, and ascribing to it the discretionary power of regulating entirely the operations of the living body, of uniting or separating elements "*at will,*" depositing or removing substances, forming them out of their elements, and tearing them asunder when formed. (p. 122.) The vital power has no will or discretion in the case; the will and discretion are in the arrangement of the vital laws, which are doubtless as definite and determinate in their operation as those of chemical action.

In a chapter devoted to the examination of the function of the capillaries, Mr. Jeffreys endeavours to explain the changes produced in inflammation, by *vermicular contractions* of those tubes. Just as a leech fills itself by vermicular contractions, so, he conceives, the capillaries of an inflamed part fill themselves with blood; and warm fomentations resolve the inflammation by diminishing the tone and action of the capillaries, so that they no longer force blood in undue quantity into themselves. The theory and illustration appear to us to be alike unsatisfactory. If a leech were a tube, patent during the time of its contractions at either end, we question whether it would become distended; nor can we conceive how the capillaries would become distended by similar movements, unless there was added to the hypothesis a "tonic spasm," or sphincter, on some point of the vessels.

In Part III, "On the dissipation of animal heat, and its influence in producing local determinations of blood, especially to the head," Mr. Jeffreys, in pointing out the secondary effects of cold and warmth, boldly controverts the common axiom "keep the head cool and the feet warm." He points out that the Hindoos, who habitually reverse this rule, are remarkably exempt from cerebral affections, in a climate where Europeans are peculiarly liable to them; and that persons who habitually act on the vulgar axiom produce, by preventing the proper functions of the parts, and the usual extrication of heat from them, a cold and bloodless state of the extremities; while the head, on the other hand, kept bald and cool, displays by its flushings and perspiration an increased tendency to vascular action. The observations are to a great extent true, and deserving of consideration; the axiom we have been accustomed to hear, and to act upon, however, will bear, we think, the test of our author's experience and observation; and is, we believe, the full and proper exposition of the axiom in question, namely, "keep the feet warm *with exercise*, and the head cool *with temperance*."

The work before us, although we have expressed ourselves thus freely on several of the most prominent theories which it propounds, contains much interesting matter for inquiry and reflection. It is the production of one who has enjoyed very favorable opportunities of observing nature in widely different circumstances, and who has brought to bear upon those opportunities the powers of an intelligent and reflective mind, sharpened and chastened by an acquaintance with the gradual progress of physiological research throughout the world. The critique on Liebig's views, contained in the various articles which form the Appendix, is especially deserving consideration; although we think that more extended chemical and physiological information on Mr. Jeffreys's part would have prevented him from making some unfounded attacks upon the doctrines alluded to.

Art. IX.

Traité Pratique de l'Amaurose ou Goutte-Sereine, avec des Recherches Nouvelles sur les Méthodes spéciales de Traitement qui conviennent à ses differentes Espèces. Par J. E. Pétrequin, D.M.P.—*Paris*, 1841. 8vo, pp. 120.

A Practical Treatise on Amaurosis, containing new Researches on the particular kinds of Treatment adapted to its various Species. By J. E. Pétrequin, M.D.—*Paris*, 1841.

Along with much that is valuable, there is a good deal of flourish and pretence in the work now before us. The author talks perpetually of his new researches, new studies, new ideas, new therapeutical views. We have been able to detect almost nothing that is new. We defy M. Pétrequin to put his finger on any one fact, or any one opinion in his book, which is not to be found fully discussed in the writings of his predecessors. Our only reason for directing our readers' attention to M. Pétrequin's work is, that, if his cases are not exaggerated, he has been very successful in the treatment of amaurosis, and we consider it important to inquire to what this success has been owing. He tells us, that a radical cause of failure, in the practice of many, is the notion, that amaurosis is simply

a palsy, and ought to be treated as such. His own success he attributes to an accurate diagnosis of the different species, and to a treatment appropriated to each, but varied according to their periods and complications. He ascribes much also to his establishment of the species, not according to the seat of the disease, which he thinks must always be problematical, but according to the essence or nature of the cause. This is a very reasonable view of the matter. To distinguish, for example, between an amaurosis affecting the retina and one seated in the optic nerve, must be frequently impossible, and even were the diagnosis made, it would generally be of no manner of use; but to confound a congestive amaurosis with one of an opposite kind might lead to the most serious evil.

The work is divided into two parts: the first consisting of particular observations, and the second of general reasonings.

The following is an analysis of the facts presented to our consideration in the first part.

Asthenic nervous amaurosis. M. Pétrequin tells us, that this species of amaurosis is the most simple, the least complex. When primary, it arises chiefly from an inordinate exercise of sight, or from some debilitating influence; such as want, age, narcotics, venery, hemorrhage, typhus, &c. It is often consecutive, originating in some other variety of the disease, as the verminous, the traumatic, or the congestive. Sometimes the cause is local, sometimes general.

The course of asthenic amaurosis is slow and free from pain. The pupils are dilated, and their motions impeded; the patient complains of visus reticulatus, and has a dull expression of countenance. This species often assumes the form of night-blindness. The patient searches for more light, and often changes his glasses in the hope of seeing better. The prognosis has generally been unfavorable, but to this M. Pétrequin cannot agree.

A tonic plan of treatment should be followed, both internally and externally, strengthening diet, the preparations of iron and of cinchona, frictions with the tincture of nux vomica, aromatic vapours, stimulating collyria, blisters to the forehead dressed with strychnia, and electricity. Setons in the neck, so much used, are hurtful in asthenic amaurosis, as well as exclusion of light from the eyes by shades.

Case i. The left eye of a woman, aged twenty-five, employed in embroidering, is affected. No photopsia, no muscæ, no pain of head or eyes. Pupil a little dilated. Everything seems as if in a whitish cloud. A cure is effected by blisters and the application of strychnia and nux vomica; ammoniacal vesication; and frictions with tincture of nux vomica.

Case ii. The right eye of a tailor, aged twenty-four, becomes incompletely amaurotic, after bathing in the river. Headach, mistiness of vision, myopia, muscæ, with a little dilatation of the pupil. Cured by frictions with tincture of nux vomica.

Case iii. To intermittent fever there supervene anæmia, anasarca, and debility, with incomplete amaurosis, and dilated, but moveable, pupils. No pain nor photopsia. Cured by good food, strychnia and powdered nux vomica repeatedly to the blistered forehead, and frictions with tincture of nux vomica.

Amaurosis from lightning. In its symptoms and nature, M. Pétrequin regards this amaurosis as approaching the asthenic or torpid, and, therefore, as requiring the same treatment. He considers it as a result of a *perturbation of the nerves* and of a *subtraction of the nervous fluid,* phrases to which no accurate signification can be attached.

Case iv. The conductor of a diligence is deprived of sight by a stroke of lightning. He has been bled, leeched, had emetics and purgatives, and been blistered, without benefit. Cured after fifteen months, by the internal use of alum. Probably a natural cure.

Case v. A sailor is struck blind by lightning. His eyes appeared so natural, that he was suspected to be simulating. Various remedies were tried, but with no effect. Gradually he begins to see in the dark, then during day, and ultimately recovers perfectly, probably in consequence of careful regimen.

Amaurosis from worms. The disease of the eyes which arises from worms in the intestines is at first only a mydriasis, and may readily be cured by anthelmintics. If the case is neglected, the retina becomes implicated, and then the removal of the worms may prove of no avail. The amaurosis approaches the asthenic. The countenance is tumid, and of a pale yellowish hue; the belly distended; the head heavy; there is nausea, with itching of the nostrils and throat, disturbed sleep, and twitchings of the face. The anthelmintics chiefly recommended by M. Pétrequin are worm-seed (artemisia Judaica,) and Corsican wormweed (fucus helminthocorton.)

Case vi. A child is cured of complete amaurosis, after passing a knot of lumbrici.

Case vii. A girl of fourteen passes sixty lumbrici, and is cured of amaurosis. M. Pétrequin merely saw the worms at Padua.

Case viii. A girl, twelve years old, after having been troubled with worms, and suffering from tinea favosa, becomes incompletely amaurotic. No pain; pupils dilated, but contractile; complains of the sensation of a black mist; sees distant objects; diplopia. Passes no worms, but is cured by vermifuges, especially wormseed and Corsican wormweed. Appetite and general health improve under this plan, and patient gains flesh. It is not clear that the amaurosis arose from worms.

Traumatic amaurosis. M. Pétrequin refers traumatic amaurosis to three principal causes, viz. contusion of the eye, concussion of its nervous system, and injuries of its accessory nerves. It generally occurs instantaneously. Sometimes it yields as the symptoms by which it is accompanied subside under treatment, but often it persists, under an asthenic character. M. Pétrequin supposes an analogy to exist between the injuries of the eye which determine amaurosis, and concussion of the brain producing palsy. The pupils are dilated and irregular.

The *first* indication is to combat the general effects of the injury; the *second,* to attack the congestive or other complications; and the *third,* should the disease continue under an atonic form, to employ either the means already recommended for asthenic amaurosis, or those hereafter to be pointed out for the cure of the torpid variety.

Case ix. A fall on the head, from a considerable height, produces concussion of the brain, which is successfully treated by bloodletting and other remedies, but vision is double, and that of the right eye is short

and indistinct. The right pupil was at first dilated; now the pupils are natural, and there are no signs of inflammation, congestion, nor irritation. The visual asthenia is treated by frictions with tincture of nux vomica. Next morning, no diplopia. The frictions are omitted, and double vision returns. They are resumed, vision again becomes single, and a complete cure is effected under a continuance of the remedy.

Case x. By an explosion in a mine, a strong man is thrown to a distance of fifteen paces. Amongst other consequences of the injuries received, the eyelids are œdematous, the conjunctivæ ecchymosed, and the patient deprived of sight. The cerebral symptoms are combated by bloodletting and other remedies. Fifteen days after the accident, the patient sees a little with the left eye, but the right continues completely amaurotic. Sixteen leeches behind the right ear restores the left eye nearly to a natural state, but the vision of the right eye is still defective. Pupils unequal in size. A gradual recovery takes place, without any particular treatment being mentioned.

Case xi. By an explosion in a mine, a man, among other injuries, receives two deep wounds on the forehead, and has his left eye destroyed entirely, while the right presents a superficial scratch of the cornea, with a dilated and irregular pupil, which is displaced upwards and motionless, and a loss of vision. The cerebral concussion and other symptoms are treated by bloodletting and abstinence. On the tenth day, vision of right eye begins to return, the pupil remaining dilated and irregular, but moveable. The patient complaining of weight in the head, fifteen leeches are applied behind the right ear. Vision improves, but it is still dim and easily fatigued. Six weeks after the injury, the visual asthenia continuing, frictions with tincture of nux vomica are had recourse to, and in three days a great improvement takes place. In six days, the sight of the right eye is perfectly restored.

Case xii. A fall on the right cheek is followed by epistaxis and insensibility, and by ptosis and complete amaurosis on the right side. Pupil dilated and motionless; malar bone depressed; palsy of the zygomatici, dilatator nasi, buccinator, and masseter; deafness of right ear; loss of speech; lower jaw motionless. Fifteen leeches are repeatedly applied behind the right ear. Sensibility returns, but the patient can neither speak nor chew. The blindness and deafness continue. Skin round orbit becomes ecchymosed. Leeches are again employed, and on the sixth day, the muscles of the lower jaw resume their office, and the ptosis disappears. On the seventh day, the patient begins to see a little, and the other symptoms gradually abate, till the twenty-third day; when, being exposed to the air and to the sun, the patient is seized with headach and other alarming symptoms; sixteen leeches relieve him, the pupil becomes normal, and vision is restored.

Congestive amaurosis. This depends on vascular derangement of the organ of vision. M. Pétrequin distinguishes three principal varieties of it, which he designates by the names of *simple congestive*, *irritative sanguineous*, and *irritative nervous* or *erethistic.**

He has seen *simple congestive amaurosis* arise, especially in some debilitated individuals, without any premonitory symptoms, without any

* From ἐρέθω, I irritate, provoke, disturb.

ulterior signs of irritation, and without photophobia. He has seen it attack the eye suddenly, like an apoplexy, or commence with myopia, and manifest itself with dilated pupils, as an atonic congestion. It bears considerable resemblance to asthenic amaurosis, from which it is distinguished by its vascular origin, the circumorbital feeling of weight which attends it, &c. In cases where sanguineous evacuations would have weakened the patient too much, M. Pétrequin has used cutaneous revulsives and laxatives, with good effect.

The *sanguineous*, or *hyperæmic irritative amaurosis* is the most common, and is generally met with in subjects about the prime of life and of a plethoric constitution, after some violent excitement of the brain or of the eyes. It depends on an active congestion of the organ of vision, either showing itself at once, or developed by degrees. It is much influenced by any disorder of the cerebral circulation, and is generally attended by evident signs of irritation, as headach, sudden confusion of sight, photopsia, photophobia, vertigo, &c. At the long run, it is not confined to a merely congestive form, but attacks the eye still more seriously, and leads to a chronic sub-inflammation of the retina. The sclerotic becomes injected; the pupil contracted and irregular. The patient complains of muscæ, and of pain deep in the orbit and in the temple. He has the sensation of fire flashing in his eyes. If the flashes change from white to blue, violet, yellow, or red, the disease is increasing; if from red or yellow to violet, blue, or white, it is subsiding.

Except in cases of excessive plethora, M. Pétrequin does not bleed much from the arm. He prefers leeches, placed round the anus, so as to act on the portal system and the liver; afterwards he plants them behind the ears, so as to affect more directly the congested organs; the congestion being relieved by leeching, he blisters the nape. Each application of leeches, he follows up with a saline purge, and afterwards keeps the belly open with pills composed of calomel and aloes, sometimes adding to them extract of belladonna. He causes the forehead to be rubbed with blue ointment, mixed with belladonna. He speaks of mercury in high terms of eulogy; as removing, if properly administered, obstructions and irritations of the retina.

The *nervous irritative*, or *erethistic, amaurosis* is met with chiefly in females, and nervous subjects, who have suffered from neuralgia, or depressing passions, or whose brains have been over-excited by intellectual labours. Contraction of the pupil, over-sensibility of the retina, chroopsia, an improvement in vision by twilight or moonlight, myodesopsia, and lacrymation are among the local symptoms. At first, objects appear too much illuminated; then they seem enveloped in a vaporous veil, which thickens more and more. Externally, anodynes are to be used to the eyes, as a collyrium of lettuce-water or of laurel-water, with an addition of the aqueous extract of opium; frictions of the forehead with hydriodate of potass ointment are to be employed; and the warm bath. Internally, Méglin's pills* are recommended; also, extract of hemlock, cyanide of potassium, prussic acid, laurel-water, inspissated juice of lactuca sativa, antispasmodics, ether, emollient enemeta, asses' milk, sometimes chalybeates, certain mineral waters, &c.

* Méglin's pills consist of the extracts of valerian, fumatory, and hyoscyamus, with oxide of zinc, of each 1 oz., divided into 516 pills.

Both in the sanguineous and in the nervous irritative amaurosis, coloured glasses are to be used, moderate exercise, abstinence from fatiguing occupations, pediluvia with mustard, laxatives, a mild vegetable diet, cold fomentations of the forehead and eyelids, amusing employments, &c.

Case xiii. Fifteen months after being cured of a catarrhal ophthalmia, a shoemaker, of lymphatico-sanguine temperament, is suddenly affected with incomplete amaurosis, without weight or pain in the head. Every thing appears as if through a yellowish cloud; no photopsia; pupils moveable. Cured by fifteen leeches to the anus, low diet, pediluvia with mustard, and laxatives.

Case xiv. A hatter, weak-sighted for three years, becomes amblyopic. Cannot see to walk the streets; grayish mist before him; amaurotic expression of face, occasional giddiness; no pain, sleep disturbed. Recovers after venesection, purgatives, and frictions of the forehead with blue ointment.

Case xv. A young woman, aged seventeen, of sanguine constitution, loses the sight of the right eye, with pain in the orbit, photophobia, and myodesopsia; pupil dilated; cannot see her fingers. The symptoms yield considerably to venesection, three applications of ten leeches, and two purges. After a blister to the nape, deciphers letters half an inch long, but the sight is still short and indistinct. A perfect cure is speedily effected by frictions of the forehead with tincture of nux vomica. M. Pétrequin congratulates himself on his tact in seizing the moment for changing the anti-congestive to the anti-asthenic means of cure.

Case xvi. A journeyman, aged eighteen, of robust constitution, drinks white wine, so as to make himself drunk for three days successively, in order to cure himself of ague, under which he has been labouring for three months. The fever leaves him at the end of fifteen days, but he is seized with weight in his head, and intense pain in the forehead and hindhead, followed by muscæ, and rapidly increasing deterioration of vision. A year after the commencement of these symptoms, he is treated by M. Bonnet with bloodlettings, blisters, and strychnia, but without effect.

He comes under the care of M. Pétrequin, who finds the pupils moderately dilated, regular, and slightly contractile, the patient still complaining of headach, and pain deep in the orbits, able to count his fingers at the distance of six inches, but seeing nothing beyond a few paces, complaining of a dark mist and black muscæ, and presenting the stupor and expression of an amaurotic. Is bled, has fifteen leeches behind one ear, and fourteen behind the other, all in the course of four days, by which means the pain of the head is diminished. Twenty leeches are placed round the anus. Head is now heavy rather than pained; dartings in temples. After twelve leeches behind each ear, and a blister to the nape, there is no headach, pupils less dilated, and although the patient will not admit there is any change in his sight, it is plain, from the manner of his walking about, that he sees more than he did. Frictions on the forehead with blue ointment, mixed with belladonna, being employed, and a second blister to the nape, pupils become natural and contractile, and vision improves, so that he distinguishes objects at fifteen paces distance. Ammoniacal blisters are applied above right eye, dressed

with one sixth of a grain, then one quarter of a grain of strychnia, and two grains of powdered nux vomica. The pupils become very contractile, and the patient reads large letters. Continues to improve under frictions of the forehead with tincture of nux vomica.

Case xvii. A journeyman, aged twenty-one, begins to lose his sight. with headach, mistiness of vision, muscæ, and giddiness as if intoxicated, The last symptom subsides after venesection, but sight continues to fail. Pupils contracted, irregular, moveable; sight short and dim, pain in hindhead, sensation of a brown veil, and of black whirling muscæ, cannot distinguish colours, impression of light painful, lacrymation. At ten paces, cannot distinguish one person from another; brought near enough, can decypher letters three or four lines long, but they become speedily obscure. Pulse full and strong, skin hot.

Twenty-five leeches round the anus, a purge, belladonna dropped in a fluid form upon the eyes. Pupils do not dilate, but become very irregular. After fifteen leeches behind right ear, right eye improves. Twelve are placed behind left, and the patient purged, after which vision becomes clearer and more extended. Headach ceases, impression from light less painful, at seven paces distance distinguishes numbers two inches long. Frictions on the forehead with a mixture of two drachms of blue ointment and half a drachm of extract of belladonna; a blister to the nape. In a few days, begins to see houses at 500 paces distance, and reads some lines in a printed book. The mistiness becomes whiteish and semitransparent; pupils still contracted, but regular. Progressive improvement. A slight relapse, during which the mistiness again becomes blackish, and presents the appearance of a wheel going round. Another blister to the neck, after which the mistiness disappears. Vision becomes clear, and of natural extent. Reads with ease. The treatment extended to about six weeks.

Case xviii. A woman, aged thirty-four, of lymphatico-sanguine constitution, menstruating regularly, is seized with pain in the temples, and awakes one morning with diplopia and indistinctness of sight. Is bled, blistered, and vomited; disease makes progress; pupils contracted and irregular; axes of eyes not perfectly parallel; impression of light painful; sensation of clouds, coloured areolæ round objects, and red sparks; cannot see small objects; distinguishes a finger at five paces, beyond which sees the hand only, which disappears at ten paces. Temporal cephalalgia, more severe on left side; aspect of stupor.

Twenty leeches to the anus; next day, Seidlitz water; momentary appearance of the menses, five days before their regular period, ascribed to the action of the leeches; headach, pain in loins, diplopia; after three drachms of cream of tartar in veal soup, pain of loins gives way; pupils more regular and less contracted; less pain in forehead; blister to nape; headach is removed; left pupil normal, right dilated; frictions on forehead with blue ointment and belladonna; two doses of Seidlitz water. Much improved; sees objects single within and beyond ten paces; left eye well, right a little indistinct; no headach. Both eyes being open, sees double at ten paces, single within and beyond this distance. Frictions with tincture of nux vomica; pupils equal in size; sees well; no diplopia, except on looking much to the right. Treatment extended to twenty-five days.

Case xix. A labourer, at the age of twenty-five, was suddenly struck with amaurosis of both eyes, which began to yield in three weeks. Next year, he had another attack, which lasted two months. Each year afterwards, for four successive years, he had a relapse, affecting the eyes alternately. On the 10th of August, 1837, the right eye is struck blind in a moment; then the left in November, when the darkness of the right abated a little. After being bled, blistered, purged, and having fifty leeches behind the ears, here is a slight amendment. Four doses of tartar emetic reduced the right eye to its former state of blindness.

On the 1st of January, 1838, comes under the care of M. Pétrequin. Eyes clear, pupils moderately dilated, and contractile; both eyes amaurotic, the right completely so; myodesopsia, thick dark mist; with right eye does not see a person at two paces distance; with left, cannot distinguish characters two inches long; cannot see to read; constitution robust; temperament sanguine; no pain of head. Purgatives and small blisters were used, without amelioration. After two ammoniacal vesications above right eye, dressed with a quarter of a grain of strychnia, and three grains of powdered nux vomica, an improvement takes place, so that he reads with that eye. On the morning of 16th of January, can read large characters, at the distance of seven feet, with right eye. At 4 P.M., loses the sight of it suddenly; cannot see even a lighted candle with it; with left reads an ordinary type. Low diet, laxatives, four grains of quina. On the 19th, is bled; vesication above right eye, and strychnia repeated; two calomel pills; quina stopped. Next day begins to discern his fingers. On the 24th, amaurosis of left eye becomes suddenly more intense; cannot distinguish letters with it of less than an inch in size. A fourth vesication, above right eye. On the 29th, venesection; fifth vesication, above left eye. 1st February, calomel stopped, in fear of salivation. Aloes pills; frictions of forehead with tincture of nux vomica. 13th, sixth vesication above right eye. Improvement continues; reads letters half an inch long with left eye; right distinguishes a pen, &c. 18th, Seventh vesication. 22d, Return of muscæ; fifteen leeches behind right ear. Eighth vesication; vision more distinct. 25th, More muscæ; fifteen leeches behind right ear. 3d of March, Ninth vesication; left eye improves. 12th, Reads an ordinary type with it. 14th, Sees people 500 paces distant. Right eye so defective, that cannot distinguish the hand with it at a foot distance. It is submitted to the action of a galvanic battery of sixteen plates; at the end of an hour sees the hand, fingers, and nails with it; vision of left more clear and extensive. Patient is enchanted; but by the evening the amendment subsides; and next day, disappointed at having lost what he had gained by the galvanism, and terrified at a power which had done more for his sight in an hour than all the other means in months, he quits the hospital.

Case xx. A countryman, aged seventy, sanguine and plethoric, is seized in September 1837, with prolonged giddiness, while thrashing corn, followed by headach and impaired vision; all objects appear red; red and yellow muscæ; reddish mist; impression of light painful. In November, sight better after sunset: progressive loss of sight, especially in right eye. Is bled, purged, and blistered, without effect.

On coming under M. Pétrequin's care, 15th of June, 1838, right pupil dilated and fixed; pain in orbits, forehead, temples, and occiput, espe-

cially on the right side; complete blindness of righ eye, which is to the patient as if covered by a thick red veil; with left eye gets a glimpse of his fingers, but does not distinguish colours, nor see a person at some paces distance; red and yellow muscæ; in the evening, sees a little better; impression of light painful; amaurotic expression and stupor. After being bled, having twenty-five leeches round anus, and taking Seidlitz water, there is a marked amelioration in his sight; pains in head cease; sees well with le.t eye. Having imprudently looked for a long time at bright objects in broad daylight, and even at the sun, a relapse, with headach; left pupil becomes immoveable like right; pains in left leg. Twenty-five leeches being applied to the anus, and twelve behind right ear, and the patient purged with sulphate of soda, a renewed improvement takes place. Left eye progresses steadily; right begins to discern objects; pain in right side of head is relieved by twelve leeches to the temple, and a purge. Left eye sees almost as well as before the commencement of the disease; right still sees red; blister to nape, and behind right ear; weight of head, with general heat and pricking of skin coming on, twenty-five leeches to anus, and this not giving permanent relief, venesection. Eyes continue to improve; frictions of head with belladonnized blue ointment. An attack of giddiness, headach, and disturbed vision, of apoplectic character; relieved by venesection, mustard pediluvia, and laxative enemata. Sight of left eye being very good, and the right capable of distinguishing the fingers at some paces distance, the patient leaves the hospital.

Case xxi is, we think, incorrectly placed among the instances of congestive amaurosis. It is one of obscurity of vision resulting from ophthalmia, in one eye at least attended by opacity of the cornea, with contracted pupil, and synechia posterior.

Torpid amaurosis. Torpid or paralytic amaurosis is more frequently consecutive to one of the other varieties than primitive, although symptoms of torpor of the retina may sometimes declare themselves suddenly. It is of importance, to study the different sources of torpid amaurosis. M. Pétrequin has seen it arise from occult syphilis, and Weller from scrofula. From the cases related, we suspect the constitution of the patient has considerably greater influence with our author in determining the case to be torpid, than the local symptoms. All the cases he relates occur in lymphatic, scrofulous, or feeble subjects.

The causes of torpid amaurosis being numerous and varied, so also are the symptoms. Even from the commencement of the disease, it requires a vivid light to produce an impression; there is consequently a sort of night-blindness; then a dull veil seems to cover all objects; the patient walks with his head elevated, as if to search for light; he has a constant craving for a clearer illumination of objects. The eye loses its vivacity of expression and of movement; the look becomes dull and amaurotic; often the countenance becomes pale, as if blanched. The pupils are generally motionless, and also dilated, except when the original cause is a very irritative congestion, for this causes contraction of the pupils.

In the treatment, the morbid complications must first be removed; then the palsy of the retina must be attacked by strychnia, and the like.

Now, here we are, with a vast pretence to originality and discovery, landed just at the old point. Here we have *palsy* of the retina, and *torpor* of the retina, expressions which convey no other meaning than just this, that the sensorial power is lost; and instead of a fine and accurate diagnosis, here we have blindness from syphilis, blindness from scrofula, and blindness from various other causes, all huddled together, and confounded under the unmeaning name of *torpid amaurosis*

Case xxii is one of scrofulous ophthalmia, with opacities of the cornea, in which venesections, an opiate collyrium, purgatives, calomel, blisters, leeches, frictions with belladonnized blue ointment, and with tincture of nux vomica, afford some relief. We protest against such a case being arranged among the amauroses.

Case xxiii appears also to be one of ophthalmia, terminating in obscurity of vision. The pupils are irregular and immoveable; on the left crystalline there is a radiated spot; intermittent headach; amaurotic look; the patient does not see to guide herself, and does not discern even the place of the window, unless the sun be shining on it. Sight has been declining for twelve years. After the use of calomel, so as to affect the mouth; blisters; frictions of the forehead with belladonnized blue ointment; purgatives; and leeches behind one of the ears; considerable improvement takes place.

Case xxiv. A weaver, aged nineteen, scrofulous but robust, has, in three weeks, become completely amaurotic, after acute pain in the forehead and temples. Pupils dilated and motionless; does not distinguish night from day; constant nictitation; dull pain in the orbits, sharp in the forehead and temples, and occasionally in the occiput. After being bled, purged, and taking twelve grains of calomel, headach diminishes, and he begins to get a glimpse of the light. Twelve leeches are applied behind the ears; a little more perception of light. The pains of the head continuing, twenty leeches are applied to the anus, followed by Seidlitz water, and a blister to the nape. Headach removed; vision slightly improved. The patient is now seized with paraplegia, but vision continues to improve. After frictions of the forehead with tincture of nux vomica, pupils less dilated and more contractile. Strychnia is given internally in doses of one eighth of a grain. Vision improves so much that he can count the lines of a printed book, and make out the large letters. Gangrenous sores form over the sacrum and haunches, and lead to a fatal termination. On dissection, a portion of the spinal marrow is found of a brownish gray colour, and softened, a consequence of inflammation. Nothing morbid is detected in the optic nerves, nor brain. The retinæ and the rest of the eyeballs seemed sound, and the limbus luteus distinct, only in one of the retinæ there is congestion of the central artery.

Case xxv. A woman, aged thirty-six, affected at twenty with a long-continued hemorrhoidal discharge, at twenty-eight with flooding after parturition, and at thirty-two with a pustular eruption, for which she was twenty-five months under treatment, had for ten years been troubled with transient cloudiness of sight. On the 15th of March, 1838, she was struck with complete amaurosis of right eye. The left eye, which had never been good, seemed also going. Salivated from mercurial frictions. 6th of April, Both eyes completely amaurotic; cannot distinguish day from night; pupils dilated and fixed; bottom of eyes of a grayish black;

no headach; mouth sore; redness and pain of throat, for which fifteen leeches are applied to neck, followed by a slight improvement. 18th, Has a glimpse of daylight, without distinguishing anything; facies amaurotica, pupils as before. Strychnia is commenced; an ammoniacal vesication is performed every four days, and the strychnia applied, till the 19th of May. Sight recovers, so that she sees small objects, and distinguishes letters nine lines long. Pupils continue dilated, but moveable.

Case xxvi. A waiter, aged twenty-four, of feeble constitution, discovered one morning on getting up, that he had lost the sight of his left eye, without headach, and without any other premonitory symptom than some degree of giddiness. He had formerly been at country work, and subject, in summer, to epistaxis, which had left him since changing his employment. This was in the end of 1837. Different means were tried, and after six months his sight gradually returned. He continued well till 12th of September, 1838, when he rapidly became deprived of the sight of both eyes, after headach, without giddiness. Pupils dilated and motionless; amaurotic expression; with difficulty distinguishes day from night. A black fog seems spread out before him; no photopsia; some pain in forehead and temples; appetite and digestion natural.

His feeble constitution forbade bleeding. After being twice purged with Seidlitz water, begins with left eye to perceive a lighted candle, like a little star; right eye distinguishes the hand at some inches distance, and a person at some paces, like a shadow. After a blister to the nape, and frictions on the forehead with blue ointment and belladonna, the headach disappears; pupils less dilated and more contractile; black fog diminishes; with right eye begins to count the fingers, and distinguish colours. In four days more, deciphers large letters, and gets a glimpse of houses 500 paces distant; with left eye, sees better to one side than straight forwards; a lighted candle seems red to it. In other four days, and in sunshine, distinguishes houses 500 paces distant with left eye; and with right, sees the windows of those houses, and reads letters two lines long. The fog threatening to return, the nape is blistered, and Seidlitz water prescribed. This is followed by an amelioration, but as there is some return of headach, twelve leeches are applied to the anus, followed by a purge; marked relief. For a time, patient suffers several relapses, and sometimes sees double. He is again blistered on the nape, returns to the frictions with blue ointment, and afterwards uses those with tincture of nux vomica. Sight improves; less fogginess; pupils regular. The right eye sees almost as well as before the disease; reads an ordinary type with it; with left deciphers letters three or four lines long, but they seemed veiled by a central semi-transparent mist; diet is improved; forehead blistered, and dressed with nux vomica. Occasional headach; reddish sparks; giddiness; fourteen leeches to the anus, with Seidlitz water next day, after which all the symptoms abate; judging the congestion to be passive, cinchona is now given, under which the general health improves; sight of right eye becomes very good; that of left extensive, and pretty clear, except in the centre. No more diplopia; reads fluently; feels well; appetite good; no headach.

Case xxvii. A young man, aged twenty-six, becomes blind, and at the same time palsied in his lower extremities. Confesses he had syphilis, but did not undergo an appropriate treatment. The amaurosis and palsy

are attributed to the action of the syphilitic virus on some part of the head and spinal column. He is put on Van Swieten's liquor. In fifteen days, begins to see, and, after two months' anti-venereal treatment, is dismissed cured.

Organic amaurosis. Under this head M. Pétrequin comprehends those cases which result from an anatomical alteration of the constituent, or of the accessory parts of the organ of vision. Their characters are not uniform, but vary as much as do their causes. Thus, still less than of torpid amaurosis, can any general history be traced of the organic.

Case xxviii. A husbandman, aged twenty-four, is affected with exophthalmos on the left side, and complete amaurosis of the protruded eye. Intra-orbital pain, photopsia, diplopia, epiphora, a feeling of pressure in the orbit. The eyelids cannot be completely closed; the pain increases. In about a month the protrusion and pain diminish, an improvement attributed by the patient to the application of a blister to the arm, but the vision continues as before.

On coming under M. Pétrequin's care, the left eye is found to be pushed downwards, and to protrude two or three lines beyond its fellow; eyelids red, and slightly œdematous: motions of eye unimpeded; it distinguishes light from darkness; pupil dilated; patient cannot open the eye to more than half the natural extent. The treatment consists in the frequent application of leeches, behind and before the ear; purgatives; calomel; a blister to the nape. Vision speedily begins to improve, a progressive diminution of the exophthalmos takes place, the diplopia disappears. At his dismissal, he knows a pair of scissors at five or six feet distance, and distinguishes one person from another at eight or ten paces. M. Pétrequin regarded the symptoms as owing to inflammation of the fibrous and cellular structures within the orbit, and to traction of the optic nerve.

Case xxix. A carrier, aged thirty-seven, is affected with inflammation of the pharynx for thirteen months, accompanied by frequent vomiting. His eyes are red, and as if pushed from their sockets by the constant efforts to vomit. Sight very weak; emaciation. The affection of throat is cured by the application of alum. Eyes less prominent and less red; sight restored. Seven months afterwards, the affection of the throat recurs, with incomplete deafness of the left ear, and amaurosis of the left eye; pupil contracted and motionless; globe of the eye deformed and flattened on its lower side, with some degree of atrophy; no vision in left eye; pain in left temple. It is treated as before; vision soon begins to improve, as well as hearing; pupil continues contracted; sees objects pretty well. Smart pain supervening towards the ear, a blister is applied to the nape with relief; hearing restored.

Case xxx. A woman, aged forty-five, strong and of sanguine temperament, is seized with apoplexy, consequent to continued pain in the head; is insensible for two days, but comes to herself after being bled; is palsied on left side; both eyes amblyopic; pupils contracted, irregular and but slightly moveable; sight extensive, but for near objects not sufficiently clear to enable her to guide herself surely; the right eye is the better; sees chiefly to one side; with an effort deciphers letters three or four lines long; muscæ; photopsia; intelligence somewhat affected.

Sixteen leeches to the anus; purge; blister to the nape; smart pains

in the palsied parts; brilliant photopsia. Twenty leeches to the anus; seidlitz water. Feels relieved; vision clearer. Headach; vivid photopsia during night. Blister to the right arm; laxative. Sight clearer, scarcely any muscæ. Headach returns. Leeches to anus; eight grains of calomel. Begins to read the numbers on the beds. Frictions on the forehead, with belladonnized blue ointment. Photopsia and muscæ fade away. General improvement. Pains of head rare. Friction of the paralytic limbs with camphorated oil. Sight quite restored, except that left eye does not see outwards. Return of headach to a slight extent; Some photopsia. Seidlitz water; friction of limbs with a mixture of camphorated oil and and tincture of nux vomica. Headach ceases; strength improves. Headach and photopsia return; general uneasiness. Leeches to anus, and laxatives prove beneficial. More headach. Ten leeches behind left ear give relief; new pains. Ten leeches behind right ear. Gradual improvement. Sight good; no muscæ, nor photopsia; begins to walk.

Case xxxi. A steam-boat fireman, at the age of twenty-two, had gonorrhœa and a chancre, followed by ulceration and perforation of the palate, eleven months after which he became affected with constant headach, grew pale, and found his ideas confused and memory short. Was bled and had his scalp rubbed with tartar emetic ointment. After a fit of drowsiness, wakes one morning with the left eye amaurotic, but as the right eye is good, quits the hospital, to attend his employment. Some days after this, perceives sight of right eye to be growing dim. A blackish mist seems to arise at the external angle of the eye, and advancing by degrees, in fifteen days crosses the visual axis, and approaches the internal angle. Headach increases. Intelligence enfeebled; memory confused; an expression of deep sadness; complains much of ennui; constant pain in the superior-posterior part of the head; great propensity to sleep. Left eye is better; at three feet distance, distinguishes with difficulty the number of fingers held up before him; pupil two lines in diameter, contracts slightly; eyelids œdematous; bright light fatiguing. Right eye more open than left; pupil more dilated; scarcely distinguishes light and shadow, if the object is placed in the direction of the axis of the eye, but if placed to the inner side of the axis, distinguishes it in part, or entirely, according to its size. This perception is very confused even at the distance of a foot; outwards or in front does not see a lighted candle.

The following treatment extended through the space of a month. Twenty leeches to the anus. Seidlitz water. Less pain of head. Less confusion in the sight of left eye; right begins to have a glimpse of objects in the direction of the visual axis; pupils less dilated. Distinguishes with right eye a pen at the distance of a foot. Improvement of right eye continues; distinguishes a pen five feet distant; left eye improves more slowly; cannot distinguish with it figures two inches high and twelve feet distant. Twelve leeches to the anus; two aloes pills. Right eye nearly equal to left; distinguishes letters two lines long; cannot yet read. Purged by aloes and calomel; blister to nape. Sees better with right than left eye; if he employs both eyes, vision less distinct; walks in the wards, and has lost almost entirely the amaurotic expression. Aloes continued, eight leeches before left ear. Continues

to see a whitish fog before left eye. Dose of sulphate of soda. Amelioration continues, but makes no progress. With right eye reads, but not fluently, words in characters two lines long; with left merely makes out the letters. An epileptic fit. Stupor; slowness of conception; memory weak; somnolency. No change in vision. Aloes pills continued. Seidlitz water. Less expression of torpor. Sight good. Ten months afterwards returns with confirmed dropsy, idiocy, and amaurosis far advanced.

Case xxxii we deem it unnecessary to quote. It is one of torpid amaurosis, which resists a variety of treatment. Such also is Case xxxiii. They seem to be placed under the head of organic amaurosis by mistake.

Case xxxiv. A man of strong constitution, aged fifty-one, is completely amaurotic for six years; the eyes preserve their natural brilliancy; pupils dilated; fungus of right maxillary sinus, the walls of which are destroyed; the whole scalp is painful. The patient dies after being three months in the hospital. On dissection, the retina presents numerous folds, crossing each other in different directions, and not arranged in the common radiated way. The texture does not appear changed; only that besides the spot of Soemmerring, which is very distinct, two other spots are observed, somewhat larger than it, separate from one another, and of a brick colour. The neurilema is very thick, and forms a sheath, not completely filled by the nerve, which is considerably shrunk. As it leaves the eyeball, the nerve is less consistent than natural, so much so that before reaching the commissure, it consists of pulp only, and even that presents a manifest solution of continuity. The commissure is in a state of commencing atrophy, and at its anterior part has lost in some measure, the appearance of cerebral substance.

Such is a condensed view of the first part of M. Pétrequin's work, and will afford our readers a tolerably fair idea of the practical and highly important facts which he has recorded. The second part consists of his general views on the subject.

He first of all explains the *principle of his classification*, viz., that the amauroses must be grouped, not according to their seat, but according to their nature. This, no doubt, would be strictly correct and philosophical, were it not a fact that it is very often just as difficult to detect the nature or essence of the pathological state which has produced blindness, as it is to fix on the part or parts of the optic apparatus in which the morbid change resides. We shall mention two causes of the difficulty of detecting the nature of an amaurotic affection. The one is, that in some subjects the local disorder is completely at variance with the general or constitutional state of the patient. Congestive amaurosis, for example, may attack a debilitated subject. A second cause is the transition of one morbid state into another; the inflammatory or congestive, for instance, passing into the torpid or atrophic. By these remarks, we do not mean to controvert the statement of M. Pétrequin, but only to show the difficulty there is of carrying out his principle in practice, and the invincible necessity, therefore of following an empirical, not a rational, mode of treatment in many cases of the disease in question.

M. Pétrequin next makes some remarks on what he terms *the elements of the amauroses*. It is not the powerless state of the nerve of vision which is to be treated, but the sanguineo-congested condition of the optic apparatus in some cases, its anæmic state in others; it is the sub-inflammatory irritation of the optic nerve, in one instance, its participation in some general dyscrasia, in another, against which our remedies are to be directed. These, and such like elements, as M. Pétrequin chooses to call them, being overcome, if visual asthenia remains, it becomes the object of treatment.

The *transformations of the amauroses* is the next topic on which M. Pétrequin touches, observing that not only do the amauroses differ from one another, but that even the same amaurosis presents at different periods of its course marked differences in its form and nature. He notices particularly two transformations. The first regards the seat of the disease; for, as it is either on the increase or on the decline, amaurosis may affect more or less extensively the retina and the rest of the optic apparatus. The second regards its nature. Asthenic amaurosis, for example, is rarely primary, but supervenes as a degeneration of the traumatic. The nervous erethistic is transformed into the sanguineous irritative, and this again into the sub-inflammatory. In directing the treatment, the practitioner must bear in view such transitions. M. Pétrequin takes little account seemingly of the difficulty of tracing such transitions. He speaks of them without hesitation as things which can be positively determined, and the treatment changed accordingly.

M. Pétrequin is inclined to believe in an *amaurotic myopia*. He supposes that as the visual faculty becomes impaired, the sphere of its activity is lessened; or, in other words, that the patient, from an affection of the retina, becomes myopic, with no diminution in the clearness of sight. More frequently, however, this amaurotic myopia is attended with a certain obscurity of vision. Those who are affected in this way, not knowing that they labour under anything more than a shortness of sight, endeavour to relieve themselves by concave glasses of increasing depth. M. Pétrequin has also known some who changed their apartments, fancying the obscurity to be from without, not from within. He remarks, that the phenomena which appear at the outset of the greater number of the amauroses recur on their decline; myopia succeeds amaurosis, as well as precedes it. Hence it is, that the eye does not resume its natural vivacity immediately after the cure of the amaurosis is accomplished; the vision retains a peculiar indecision for a long time; and the physiognomy a sort of stupor, and a characteristic attitude, which is termed the *facies amaurotica*.

The myopia in question, M. Pétrequin believes to depend, not on any change in the refractive media of the eye, but solely on a vital cause, and he compares it to those morbid states of the other senses, and especially of the ear, in which it is necessary to bring the object much nearer to the organ, than in the healthy condition, to produce the usual impression.

With regard to the alleged frequency of *relapses in amaurosis*, M. Pétrequin remarks, that one cause is to be found in the nature of the disease, and that the original source of the amaurosis may predispose it more or less to relapse, according as it is asthenic, congestive, erethistic,

torpid, or organic. A second cause consists in the perpetual exposure of the organ of vision to external stimuli, which should be avoided by moderating the light, not by excluding it entirely. For this purpose, coloured convex glasses of long focus are recommended by our author, and a long convalescence, before the eyes are seriously set to work. The patient should confine himself to *seeing* for a time, before venturing on the more trying exercise of *inspecting*. The sympathetic connexions which the eyes have with the other parts of the economy in a state of derangement, is a third cause mentioned by M. Pétrequin, and one which evidently points out the propriety of the strictest attention to the non-naturals.

There is nothing new in the *remedies* employed by M. Pétrequin. They consist chiefly in bleeding, generally and locally; locally, by leeches round the anus very frequently; purgatives; mercury; counter-irritation; and the endermic employment of strychnia. It is, therefore, to a selection of the proper season for administering the remedies, to a perseverance in their use, and to the having his patients constantly under his observation in an hospital, that the success of M. Pétrequin must be attributed. He ascribes much to the powers of strychnia, which he uses always externally, never internally. What he employs is prepared by M. Pelletier. M. Pétrequin applies it pure, in preference to mixing it up with fatty substances in the form of ointment. As it is applied in doses of a quarter to a third of a grain, a quantity from its smallness apt to be lost, he mixes it with a grain or two of powdered nux vomica. The blisters which precedes the application of the strychnia, M. Pétrequin forms instantaneously by means of a strong ammoniacal salve. This makes a clean, moist surface, on which to sprinkle the strychnia. At each application afterwards, care is taken to remove the false membrane which has formed in the interval. This, however, is insufficient to prevent the absorption diminishing as the wound dries, so that the doses may be increased, till a new vesication is deemed necessary.

An adjuvant of considerable value is the tincture of nux vomica, prepared with four ounces of the powder to a quart of brandy. This is used for stimulating the branches of the fifth nerve round the orbit, and thus acting sympathetically on the retina.

As strychnia is one of the remedies upon which M. Pétrequin chiefly depends in the treatment of amaurosis, it is important to observe, that it is only when the disease exists in the state of a pure asthenia, that he has recourse to it. The morbid elements which existed in combination with the asthenic state being removed by other means, this stimulant, as it is generally regarded, may be employed with hopes of advantage. M. Pétrequin regards it as an excitant both of the circulating and of the nervous system. It is a remedy, then, to be avoided in congestive or inflammatory cases. These require bleeding, purging, and mercury.

The notion generally entertained respecting nux vomica, and its alcaloid, strychnia, is, that they are powerfully stimulating. This belief is built, first, upon the admission that these substances cure palsies, which are presumed to be asthenic, and second, upon the fact that they give rise to tetanic spasms. Hence the rule, above referred to, that we are to abstain from using strychnia, where there are signs of plethora about the eye or the brain. But the school of Rasori maintain a totally different

doctrine. M. Rognetta, for example, is of opinion that far from being an excitant, strychnia is a hyposthenisant or sedative, and that it depresses the powers of life, like bleeding or like belladonna. M. Rognetta also asserts that strychnia produces no effect, except by being taken into the circulation. He therefore gives it internally, in the form of an acetate; the dose varying from one twentieth of a grain to half a grain.

We have not hesitated to state very plainly what we consider M. Pétrequin's chief fault. We cannot quit him without noticing one particular which has given us great pleasure in the perusal of his work, namely, his energetic perseverance in endeavouring to accomplish the cure of his patients. We may, perhaps, be permitted to say that this, along with the reputation for success in treating cases of blindness, which he must have acquired, must have powerfully promoted the cure of such a disease as amaurosis—a nervous disorder, in many instances, of asthenic character, and, therefore, requiring the aid of a beneficial stimulus to the mind, such as that afforded by the exercise of hope, and the confident expectation of relief. We believe, that there is perhaps no disease in which moral influences of this kind are of so much importance as amaurosis; while, on the other hand, nothing proves so hurtful, as when the patient is either informed directly, or gathers from the dry, indifferent, inattentive, or repulsive manner of the practitioner, that the disease is hopeless.

ART. X.

1. *New Memoir on the true Spinal Marrow, and its Anatomy, Physiology, Pathology, and Therapeutics.* By MARSHALL HALL, M.D. F.R.S. L. & E. —*Lond.* 1843. 4to, pp. 94, with Five Plates.

2. *On the Structure, Relations, and Development of the Nervous and Circulatory Systems, and on the Existence of a complete Circulation of the Blood in Vessels, in Myriapoda, and Macrourous Arachnida. First Series.* By GEORGE NEWPORT, Esq., President of the Entomological Society of London, Corresponding Member of the Philomathic Society of Paris, &c. 4to, pp. 60, with Five Plates. (*From the Second Part of the Philosophical Transactions for* 1843.)

I. THE present memoir, Dr. M. Hall informs us, may be considered as supplementary to his two former memoirs, published in 1837; and as illustrative of his subsequent volume, on the 'Diseases and Derangements of the Nervous System,' published in 1841. To us it seems to contain little that is not embodied in his last-mentioned work, save some criticisms upon his critics; and as we have so recently and fully noticed this, we shall confine ourselves on the present occasion to those questions, on which Dr. Hall throws a new light in the memoir before us. We shall, first, however, in justice to him, quote his *present* statement of his claims, to the general truth of which we fully assent; and if our readers will take the trouble to consult and compare our former articles on the subject, they will find that we can do so without the slightest inconsistency.

"I have reflected with much satisfaction, that, of my various statements, I have scarcely had one to retract, after all the criticism which has been somewhat

lavishly bestowed upon them: and that, of the statements of others, scarcely one has either added anything to what had been done, or has proved correct. [We presume that Dr. M. Hall here refers to the *physiological* part of his system; the *anatomical* he has confessedly left to others to work out.] I regard these events as the reward of the care which I had taken to restrain myself within the limits of the most obvious facts, and of the most immediate deductions from those facts. Thus I have restricted the reflex actions to the true spinal marrow. Those who have imagined that a similar reflex function belongs to the cerebral or to the ganglionic system, have, I think, only confused the subject, and added what is really hypothesis or conjecture. I have also confined the part performed by the reflex function within its just limits Some writers, having extended its influence beyond those limits, have again caused a doubt to be cast over the whole system. In the actions of walking in *man*, I imagine the reflex function to play a very subsidiary part; although there are, doubtless, facts which demonstrate that the contact of the sole of the foot with the ground is not unattended by a certain influence upon the action of certain muscles. It is very different in the *bird* and *fish* tribes, as I shall have occasion to explain hereafter.

"Some writers have taken very unnecessary trouble to prove that the experimental fact of reflex action has long been known to physiologists; as if this had ever been denied, or as if it had not been admitted in the most express terms. (See my First Memoir, § 107.) Others have even descended to show that the term reflex had been employed by former physiologists! (Arnold.) I have never claimed either to have been the first to observe the facts of the reflex action in experiments, or to have been the first to use the term reflex. My real objects have been:—First, to separate the reflex actions from any movements resulting from *sensation* and *volition;* secondly, to trace these actions to an acknowledged source or principle of action in the animal economy—the *vis nervosa* of Haller—acting according to newly-discovered laws; thirdly, to *limit* these actions to the *true spinal marrow*, with its appropriate incident and reflex nerves, exclusively of the cerebral and ganglionic systems; fourthly, to apply the principle of action involved in those facts to *physiology*—viz. to the physiology of all the acts of *exclusion*, of *ingestion*, of *retention*, and of *expulsion*, in the animal frame; fifthly, to trace this principle of action in its relation to *pathology*—viz. to the pathology of the *entire class of spasmodic diseases;* sixthly, to show its relation to *therapeutics*, and especially to the action of *certain remedial and certain deleterious physical agents;* finally, it is to these objects taken together as a *whole* or as a *system*, that I prefer my claims; and I do not pretend that an occasional remark may not have been incidentally made by some previous writer, bearing upon some one or more of them." (pp. 4-5.)

"No better idea of the importance of this discovery can be adduced, than the total obscurity and confusion which are observed to prevail in the best works on the nervous system, written previously to its promulgation. In Legallois we have the utmost confusion in regard to sensation and volition, in their relation to their seat in the nervous system and to the reflex motions; in the work of M. Brachet we have the same confusion in reference to the reflex actions and the functions of the ganglionic system; and every physiologist remembers, what is so forcibly expressed by Professor Müller, that this latter part of the nervous system was supposed to explain all the sympathies, whence the designation great sympathetic." (pp. 6-7.)

It is but just to the British school of physiology, however, that we should remark, that the erroneous view last adverted to never prevailed in this country among the best-informed physiologists; and that, although the automatic movements were ordinarily confounded with those in which sensation and volition are concerned, they were attributed to the cerebro-spinal system of nerves,—although very far from being properly defined or systematized.

The following is Dr. Hall's general view of the relative amount of the excito-motor power, as possessed by different parts of the nervous system:

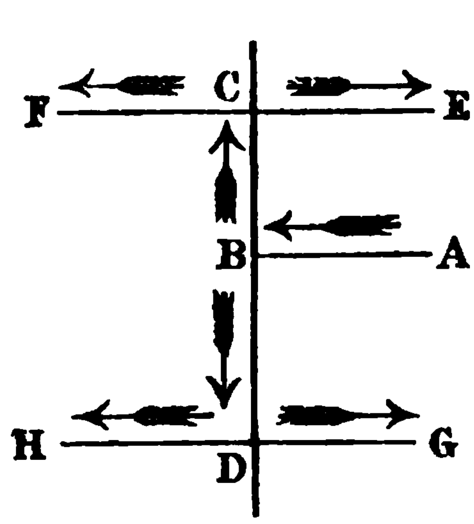
"The nervous system may be divided into different portions, according as they are endowed or unendowed with the excito-motor power; thus, in general terms, the cerebrum and cerebellum are *in*-excitor; the medulla oblongata and medulla spinalis are excitor; the nerves of special sense are in-excitor, the trifacial and the analogous spinal nerves are incident excitor nerves; the nerves distributed to muscles are direct excitors; the ganglionic system is excito-motor, but for reasons which will be given hereafter, in a less prompt and energetic degree. The nervous system may therefore be viewed in its cerebral or in-excitor, its true spinal and excitor, and its ganglionic or slowly-excitor portions. The in-excitor portions of the nervous system coincide with the seat of the mental functions. The excitor portions are chiefly dedicated to the acts of ingestion and egestion. The less excitor or ganglionic portions are the nervous agents in secretion, &c. The true limits of the excito-motor power have been accurately determined by M. Flourens, who also ascertained that whilst this property acts in a direct manner in the medulla oblongata, the medulla spinalis, and the muscular nerves, its action is *crossed* from the tubercula quadrigemina or, rather, the peduncles." (pp. 17-18.)

Dr. Hall next endeavours to develop his views respecting the new laws of action of the *vis nervosa*, which he claims to have discovered. On this point, as our readers may recollect, we have on former occasions expressed our inability to discern the novelty of Dr. Hall's doctrines; since it seems to us that the principal change is a verbal one,—namely, his employment of the term *vis nervosa* in a sense in which it had not been previously used. As, however, he considers the right understanding of the laws in question to lie at the foundation of his physiology, we shall place them before our readers, that *they* may benefit by them if *we* cannot.

The *vis nervosa* of Haller is that power, which, travelling along the nervous trunks, excites the muscles to contraction; and, according to Haller himself, as well as later physiologists, this power acts only in the *peripheral* direction,—that is, from the centre to the circumference, the roots to the trunks, the trunks to the branches, the branches to the muscles. "The motor power in the nerves," says Professor Müller, "acts only in the direction of the primitive fibres proceeding to the muscles, or in the direction of the ramification of the nerves, and never in a retrograde direction;" and, "all motor fibres act in an isolated manner, *from* the trunks of the nerves *to* the smallest ramifications."

"As long," says Dr. Hall, "as these views were entertained by physiologists there could be no application of their principle of action, discovered by *experiment*, to actual *physiology;* for, with *one* exception—that of the tone of the muscular fibre—*every* physiological action of the *vis nervosa* or the excito-motor power proceeds along the nerves, in the first instance, in an incident direction *from* their ramifications *towards* their trunk, and thence into the true medulla; *from* and *by* which latter it is *reflected* along other nerves in the direction described by the physiologists whom I have quoted I have ascertained by a series of *experiments* that the excito-motor power does act in these incident and reflex directions; and I consider the correction of the former error and the establishment of this fact as the first step towards the application of this power to the science of physiology." (pp. 22-3.)

Of the experiments on which Dr. Hall rests his proof of these rather startling positions, we shall cite the *one* which includes all the rest; giving at the same time a rough imitation of the illustrative diagram.



"If a lateral nerve (AB) running from the spinal marrow and truncated at a certain distance from it be stimulated, the anterior and posterior extremities (CE, CF, and DG, DH,) are again moved by the contraction of their muscles. The excito-motor power acting first in an *incident* direction (AB) towards the spinal marrow, then in a *reflex* manner *within* the spinal marrow; (BC and BD, the former being *retrograde*, according to Dr. Hall, the latter *direct*;) and, lastly, in a direction *from* the spinal marrow and *towards* the nervous system, (CD, CF, DG, DH.) If a nerve near the anterior extremities be stimulated, the muscles of these extremities are most moved; if a nerve near the posterior extremities be stimulated, these are most moved in their turn: if a nerve intermediate in its situation be stimulated, the anterior and the posterior extremities may be moved equally.

"It will be observed that these facts are in direct bopposition to the exclusive *law* of action of the excito-motor power propounded y Haller, Prof. Müller, &c. They establish, indeed, a *new law of action* of this power, on which the whole of its physiology depends." (pp. 24-5.)

It appears, then, that Dr. Hall regards the *vis nervosa* or *motor power* of Haller and Müller as *originating* at the point A, and as merely *reflected* by the spinal cord at the point B. If this could be *proved*, a new law of its transmission would certainly be established by Dr. Hall's experiments. But we can find no proof whatever of the *identity* of the influence travelling centripetally along A B, and centrifugally along C E, or D G. It may, or may not, be the same. The plain deduction from the experiment in question, and all others of the same nature, seems to us to be this: that a stimulus applied at A gives rise to *an* influence which travels along the incident trunk A B, until it reaches the spinal cord. The trunk there enters the ganglionic centre of the cord,—the seat, as we have reason to think, of all that is peculiar in its functions; and from this centre proceed the *motor* trunks, which may pass either up or down the cord before making their exit from it to the muscles, which they stimulate to action. We think, in the absence of any proof to the contrary, that we are still entitled to consider, with Haller and Müller, that the *vis nervosa*, or *motor* power, originates in the nervous centres; and that, just as the will or an emotion is the stimulus which occasions its transmission when voluntary or emotional actions are to be produced, so the *excitor* power (to use Dr. Hall's own phraseology) conveyed by the incident nerves, is its stimulus in the case of the reflex actions. It seems to us that we might just as much speak of *contractility* as a property of the motor *nerves*, because their agency throws the muscles into contraction,—as attribute a *motor* power to *incident* nerves, because their agency excites that motor power in the spinal cord. If the spinal cord (and the ganglia corresponding to it in the invertebrated animals) be not the source or centre of the motor power, why should the incident nerves pass into it at all? If *they* convey motor power, why should they not at once go to the muscles on which they are to act? It is surely not enough to say that the spinal cord *reflects* the impulse (as a mirror reflects a ray of light;) for there would be no need of such reflection, if the fibres did not go completely out of their course to enter it. Take, for example, the case of the closure of the lids by the orbicularis, on the application of a stimulus to the

tarsal edges, in an animal whose cerebrum has been removed or rendered powerless by a blow. The irritation of the surface excites a change in the extremity of the fifth nerves distributed upon it, which is conveyed along the incident trunk of that nerve to the spinal cord; from the latter proceeds the seventh pair of nerves, which, as it calls muscles into action, we term a motor trunk; and a change in the state of this trunk is made, by which the orbicularis is called into action to close the lid.

Now, have we any authority for stating, that the motor power, which was brought to the orbicularis by the seventh pair, *originated* in the extremities of the fifth, and travelled *towards* the spinal cord at first? Or is it not more conformable to our general ideas on the subject, to regard it as originating in the spinal cord, in virtue of the stimulus or excitation which this organ has received from the impression conveyed to it by the fifth pair? We hope we shall not be suspected of any tendency to undervalue or depreciate Dr. Hall's merits, by urging these views upon our readers. It does not seem to us that there is any important *practical* difference between our notions and his; but we fear that this part of his doctrines may prove a stumbling-block in the way of some, who would otherwise receive his system without difficulty; and that being a theory which *is not* required for the explanation of the facts, it may give an erroneous impression as to that which is. We think it a pity that Dr. Hall does not constantly adhere to the phraseology he elsewhere employs, which is liable to no exception. Thus, in § 152: "I believe that, before the date of my investigations, such an idea or view of *incident nerves*, acting in and through their connexion with the true medulla spinalis and certain *reflex motor nerves*, did not exist in anatomy or physiology." Why will he talk of *incident motor* nerves as having a demonstrated existence?

In the section on the nature of the Excito-motor power, Dr. Hall dwells much upon the necessity of the circulation of arterial blood through the spinal cord, as a condition of its manifestation; but, successfully, as we think, combats the idea of Müller, that the circulation of arterial blood through the medulla oblongata is the *primum mobile* of the respiratory movements. The following observation is of much interest:

"In the very young [warm-blooded] animal, and in the cold-blooded animal, the phenomena of the excito-motor power are far more vividly manifested than in the older and the warm-blooded. In the very young kitten, even when asphyxiated to insensibility, every touch, contact, or slight blow—every jar of the table, any sudden impression of the external air, or that of a few drops of cold water—induces at once energetic reflex movements and acts of inspiration. The nostrils, the tail, the soles of the feet, the general surface, are all extremely susceptible, and in degree in the order in which I have mentioned them. Hence, nature's provision for the first establishment of the first acts of inspiration, and of extra-uterine life. Hence the principle of resuscitation from congenital asphyxia; a subject to which I shall recur in the sequel. *Immediately* after decapitation, or the sudden amputation of a limb, a diminished condition of the reflex excito-motor power is observed:......the animal was placed under the influence of *shock*. In addition to the sources of excito-motor phenomena already noticed, I must now add another: in irritation of any or all of the internal membranes and tissues, serous, mucous, cellular, &c., by means of the scalpel or forceps, in the kitten or the dog, (these were the animals in which I have witnessed these results,) various spasmodic movements are observed. What *physiological* object there may be in these phe-

nomena I do not at present perceive, but it is plain that they present a newly-opened and expansive field of investigation to the pathologist." (pp 29-30.)

The following section, on the 'Appearances of Design,' we shall quote in full, on account of the admirable mode in which the argument is stated. We have ourselves urged the very same considerations, in commenting upon Prof. Volkmann's objections, in a former volume. "The mere adaptation of particular movements to designed ends," we remarked, "cannot be regarded as a reason for supposing that these movements are voluntary, or even dependent upon sensation. The whole organized fabric is made up of a number of such adaptations. The motions of the heart, alimentary canal, &c., are instances of their simplest forms. The motion of the pupil is a case more directly to the purpose, being a reflex action evidently adapted to a particular object,—the conservation of the eye in the state best adapted for the visual function; yet every one knows this to be independent of volition, and pathology shows that it may be performed without sensation." (See vol. VI, p. 213.)

"Every physiological act of the reflex excito-motor power is obviously designed; the act of deglutition, the act of inspiration, the closure of the eyelids, of the larynx, the action of the sphincters;—all is replete with obvious design. How, therefore, the appearance of design in some of the reflex actions observed in experiments should have been imagined, as they have by my venerable friend Prof. Nasse, by Prof. Volkmann, and others, to indicate the presence of a *mental* operation, I cannot comprehend. Thus, if in the decapitated or divided tortoise, we irritate the tail, the posterior extremities are protruded towards the part, so as apparently to remove the cause of irritation; if we pinch the integuments, the extremities are retracted; if we irritate the anus, the limbs are moved so as to be brought into contact with the part. The *design* in all this is obvious; but is it design in the decapitated or divided animal? Certainly not: but of its omniscient Creator! It coincides with what would be design in the animal; otherwise, in such acts of the living and perfect animal, the act of volition and the act of the reflex excito-motor powers would counteract and frustrate each other. We may, I believe, be so far allowed to reason from final causes. And may we not be allowed to say, it is all beautiful, and demonstrative of the wisdom of Him who fashioneth all things after his own will? It is in this manner that the march, the flight,—yes, and the inspiration of birds and of insects, coincide in effecting the combined objects of locomotion and of a most vital function. It is in this manner that we are enabled to contemplate the migration of animals, as effected and continued, however long, like the acts of inspiration, on a principle not susceptible of fatigue. I suspect, indeed, that the migratory traveller is frequently actually visited by nature's sweet restorer, during its aerial transit! In this manner, the ostrich pursued its course, after decapitation by the crescent-headed arrow of the Roman emperor; and the decapitated cock of Kaaw Boerhaave ran on in the direction towards its food, previously impressed by its volition; each successive contact of the foot with the ground exciting the subsequent movement." (pp. 31-2.)

The drawing-up of the limbs of the frog, which takes place after the division of the spinal cord, and which has been referred to by Prof. Volkmann as a *spontaneous* action, denoting sensibility, is thus simply accounted for by Dr. Hall:

"In the first instance, after the division of the spinal marrow, the animal is under the influence of *shock*, and the excito-motor power, with the reflex actions, are suspended for a time. After a short interval, however, this power, with its phenomena, return; the limbs stretched out are then stimulated by its firm pressure against the table, and an excited action, with the retraction of these limbs, occurs." (p. 35.)

In regard to the *distinct anatomy* of the excito-motor system of nerves. Dr. Hall still expresses himself as caring little about the solution of the question. He considers Mr. Grainger's deductions, with respect to the relative offices of the gray and white portions of the cord, as *probable*, but not *proved;* and of the view of Dr. Carpenter and Mr. Newport, respecting the distinct anatomy of this system, in the Articulata, he merely says, "I doubt not that the investigations of these gentlemen are correct; they have, therefore, confirmed what I had long previously done. But it adds nothing, or very little, to the argument, to ascertain that that which is true in one class of animals, proves to be so in another or others."...."It has always appeared to me," says Dr. Hall further on, "that, observing the difference between the cerebrum and the spinal marrow, the olfactory and the trifacial nerves, in regard to their psychical and excito-motor properties, it is very improbable that in *any* part of the nervous system the two functions should coexist in any one individual fibre. The difference of function implies a difference of structure; the difference in physiology implies a corresponding difference in the anatomy. But I am weary of the wordy discussions on this subject; these, therefore, I leave to those who have leisure and taste for them." Now let us analyse this statement, and apply the same line of argument to another case. Dr. Hall has proved, to his own satisfaction, (and, as we freely admit, to ours also,) the existence of a set of nerves *physiologically*—by which we presume he means *functionally*—distinct from those which are concerned in sensation and voluntary movement. But he has not attempted to prove, that these nerves are *anatomically* or *structurally* distinct; and has, in fact, continually expressed himself to the effect that he did not consider such a proof of any consequence. Now if the question were left in this state, its condition would be *precisely the same* as that of the question between the motor and sensory nerves, previous to the discoveries of Sir Charles Bell. Everybody knew THEIR *physiological* distinctness, and some guessed at their *anatomical* distinctness;* but the prevalent opinion, sanctioned by the authority of Haller, was, that the very *same* fibril may be *sensory*, when the change it conveys or communicates is travelling from the periphery to the central organs; or *motor*, when it propagates an influence from the nervous centres to the muscles. In what, then, did Sir C. Bell's merit consist, if there be none in showing that nervous fibres have distinct offices, in virtue of their different connexions with the central and peripheral organs?—in other words, that the fibres which are *physiologically* distinct, are *anatomically* distinct also? In the same manner it might be argued, and *has been* argued, in regard to Dr. Hall's distinct excito-motor system, that although an ingenious hypothesis, it has no real foundation, *because its distinct anatomy cannot be shown;* as there is no *proof*, however *probable* it may seem in Dr. Hall's eyes, that the very same incident fibre may not serve to convey the stimulus for reflex action to the cord, and a sensory impression to the brain; or that the very same motor fibre may not convey to the muscles the influence of the reflex action of the cord, and of the voluntary impulse originating in the brain. This, in fact, is the very

* It appears that *Albinus* taught this, in a very positive manner, upon *general* grounds; but missed the *particular* proof of it which Sir C. Bell obtained. See Sir W. Hamilton's Historical Notices, in the Edinb. Phil. Journ., July, 1843.

exception taken by the whole mass of the German physiologists to Dr. Hall's doctrines; and we despair of their adhesion to them being ever gained, until they have been convinced of the ***anatomical distinctness*** of the excito-motor system of nerves; and this we do not think they will ever be by the study of the Vertebrata alone, because the two systems are there so blended together, as to render it impossible to isolate them for the purposes of experiment. In showing, therefore, that the sensori-volitional and excito-motor systems of nerves are structurally distinct in the Articulata, and that their respective functions can be separately experimented upon, we think it evident that Dr. Carpenter and Mr. Newport have done what Dr. M. Hall has *not* done; and what, when the results of their labours are duly considered, must gain assent to Dr. Hall's doctrines in many quarters where it is at present withheld. They have, in fact, done for the excito-motor and sensori-volitional systems, precisely that which Sir C. Bell did for the sensory and motor nerves; and just as Sir C. Bell would have found it difficult, perhaps impossible, to prove the structural distinctness of these in any other class than the Vertebrata, in which the trunks may be distinguished at their roots into afferent and efferent,—so is it difficult, perhaps impossible, to determine the distinctness of the sensori-volitional and excito-motor systems in any other class than the Articulata, in which the division of the nervous trunks at *their* roots, into the reflex and cerebral, can be made evident, both by anatomical and experimental investigation.

We hope that we shall not be thought to depreciate the merit of Mr. Grainger's labours in what we have now said; but we believe that his confidence in his own account of the anatomy of the spinal cord of Vertebrata, has been rather shaken by the recent observations of Dr. Stilling. To this subject we shall presently return, when giving an account of Mr. Newport's examination of the centipede.

The following is the principal novelty to be found in the sections of Dr. Hall's memoir devoted to the Anatomy and Physiology of the true Spinal Marrow. It relates to the nature of the œsophageal portion of the act of deglutition, on which opposite opinions have been expressed by Prof. J. Reid and Prof. Volkmann.

"This discrepancy I believe to originate in too exclusive views of the subject. Prof. J. Reid observed that after the division of the pneumogastric nerves above origin of the superior laryngeals in the rabbit, the principal part of the parsley eaten by the animal remained in the œsophagus, a few leaves was all that reached the stomach; [whence he inferred that the muscular contraction of the œsophagus is of a reflex character.] Prof. Volkmann concludes, from experiments made on the calf, in which the pneumogastric nerves were divided, and on the frog, in which the brain and spinal marrow were destroyed, that the deglutory movements of the œsophagus do not depend on the pneumogastric nerves. The fact is, I believe, judging from my own experiments, that the action of the œsophagus in deglutition is of a double or mixed character—prompt under the influence of the pneumogastric nerves, and of a slower character under the immediate influence of the peristaltic action of its muscular fibres. These views are supported by the following experiments:—The pneumogastric nerves were laid bare in a rabbit, and a considerable portion was removed; a little cabbage was then given. Deglutition seemed to be perfect at first; soon, however, uneasiness and a sort of cough was induced, a little of the cabbage with mucus being expelled. The rabbit was killed by a blow on the back of the neck. On examination the stomach was found replete with bran, &c., and the œsophagus with the green cabbage; not a

particle of the latter had reached the stomach, but a little was found in the larynx and trachea. The peristaltic movements of the œsophagus were very marked, and expelled the cabbage through the lower extremity when this was cut. A *comparative* experiment was tried. Two rabbits were taken, and a portion of each pneumogastric nerve was removed in *one*. A very little cabbage was then given to both. In twenty minutes they were killed. In the rabbit in which the nerves were entire the cabbage was found entirely in the stomach, the œsophagus being quite empty. In the other a very little of the cabbage had passed into the stomach, whilst the œsophagus contained it from beginning to end. The action of the œsophagus under the influence of the pneumogastric nerves is, like that of pharynx, rapid and energetic. Its action after the nerves are divided is slow and peristaltic, like that of the intestine. The latter is obvious in the œsophagus separated entirely from the animal, and of sufficient power slowly to expel its contents." (pp. 53-5.)

We have little doubt that this is the true view of the matter; and that it is to be extended to the stomach also, with this difference, that in the latter the peristaltic movement is the prodominant action. It has been clearly proved that the pneumogastric *does* act upon the muscular coat of the stomach, since distinct contractions of that viscus have been repeatedly excited by irritation of the nervous trunk. But it also seems indubitable that the influence of the pneumogastric is not essential to the movements of the stomach; since Prof. J. Reid has ascertained that digestion and the passage of the digested aliment into the intestinal canal, which cannot be effected without these movements, may take place with almost their normal regularity after section of the pneumogastric on both sides. There is therefore a very beautiful gradation in the character of the movements concerned in the ingestion of aliment, as we trace them from the mouth downwards. Those by which it is introduced into the mouth are voluntary, in the higher animals at least; the act of pharyngeal deglutition is purely reflex; that of œsophageal deglutition is principally reflex, but partly peristaltic, or independent of nervous agency; the contractions of the stomach are chiefly peristaltic, but partly reflex; and those of the intestinal canal are still more restricted to the peristaltic character, but are probably in some slight degree reflex also.

In speaking of the connexion between the lower part of the spinal cord and the actions of the generative apparatus, Dr. Hall remarks:

"In connexion with these latter subjects I may observe that the next improvement in the obstetric art will, I believe, arise from the application of our knowledge of the excito-motor principle to that department of medicine. Remedies in the cases of sterility and of lingering labour, of atonic hemorrhagy, and other forms of inertia of the uterus will probably be found in some of the excitants of the excito-motor power." (p. 56.)

We rather wonder that Dr. Hall should not have adverted to the operation of several of the means employed by the accoucheur to bring about the contraction of the uterus in cases of hemorrhage after parturition, as examples of this kind of action. Every one knows the efficacy of friction upon the abdominal surface; where this fails, the sudden contact of the hand, previously cooled by immersion in cold water, will often produce the effect; if this should not succeed, the uterine contraction may often be brought about by the sudden immersion of the patient's hands in cold water; and the continuance of the hemorrhage requires the still more violent remedy of a dash of cold water over the surface of the trunk. Or

the application of the child to the nipple has been said to produce uterine contraction, when other mild remedies have been unsuccessfully tried. It can scarcely be necessary to point out, that reflex action is evidently the channel of all these operations. The subject is afterwards slightly noticed in the section on the *therapeutics* of the true spinal system, which contains many valuable hints regarding the treatment of various diseases, particularly those of a convulsive nature. The importance of the *alternation* of the impressions of *heat* and *cold* in the treatment of congenital asphyxia, is particularly dwelt upon; and ample proof of its effects has been afforded by two papers by Mr. Simpson and Mr. Barlow, in the 'Lancet,' for 1842 and 1843. The necessity of *continuing* the resuscitating means for some time after respiration has been established, with the view of preventing a relapse into secondary asphyxia, is also strongly enforced:

"Perseverance is not less necessary in this case than in that of poisoning from opium. The blood is still poisoned; and a slight comparative failure in the respiration, as from sleep, may add to the dose of poison, (carbonic acid,) and prove fatal. My friend Mr. H. Smith has made a most important remark: *after* the partial establishment of respiration—therefore *after* inflation of the lungs—secondary asphyxia may prove fatal, and the life of a supposed criminal mother may be placed in fearful jeopardy, even by the medical evidence! Next to the remedies which have been noticed, the exposure of the face especially to a current of cold air will prove most important; and even after the infant is restored to animation, and clothed, its *face* should be freely exposed in a cool atmosphere. The fan may also prove of great assistance; the sudden gusts induced by it are especially useful. It is not in asphyxia only that these measures are important; in nausea and vomiting, in faintishness and syncope, in various sudden seizures, as in the convulsive diseases both of children and adults, they are equally useful. The cold breeze is the best remedy against sea-sickness, and extremely useful in asthma; the dashing of cold water on the face is the most efficacious remedy in syncope. In one case my friend Dr. Heming kept off the convulsive attack in an infant for a very long time by watching the premonitory symptoms, and sprinkling cold water on the face or surface. It will be remembered that Dr. Denman did the same thing in a case of puerperal convulsion. The larynx is opened, inspiration was excited, and the fit prevented." (pp. 65-6.)

In a subsequent section Dr. M. Hall again discusses at some length the nature of the act of respiration, with the view of setting right some misconceptions which have been entertained in regard to his view of it. As we have not partaken in these, however, we need not again take up the subject, but shall simply quote the following experiment, which shows how much the respiratory act may be excited by stimuli acting through the nerves of the general surface.

"If we remove the cerebrum and divide the pneumogastric nerves in a young kitten, the number of the acts of respiration may be reduced to four in a minute, in spite of the circulation of venous blood; but, by directing a stream of air on the animal, or irritating various parts of the general surface, we may excite twenty or thirty acts of respiration within that space of time." (p. 78.)

In a subsequent section "On the respiratory movements in asphyxia," Dr. Hall brings forward the novel doctrine, that whilst the ordinary movements of respiration are *reflex*, being excited through the medium of appropriate incident nerves, those which occur in asphyxia are of *centric* origin, being occasioned by the circulation of venous blood in the medulla oblongata. Without doubting that this last cause has a most

important, agency, we must own that we cannot see the evidence of its *exclusive* operation; and there is a little more of dogmatism than of argument, in the manner in which this doctrine is propounded.

With the exception of an Appendix, containing a recapitulation of the positions previously advanced, the memoir contains nothing that has not now been placed before our readers in some form or other; and they will perhaps share with us in the feeling of surprise, that Dr. Hall should have thought it desirable to publish it in its present form. This, however, is his own affair; and though we may fairly say that we expected to have found more novelty in it, we have no right to complain that one who has done so much for physiology as Dr. M. Hall, should now be disposed to rest awhile, to give time for his labours to be appreciated, and aid, by the explanation of apparent difficulties and the correction of trifling errors, in promoting their general reception. This we take to be the purpose of the memoir, and we cordially hope that it may be successfully accomplished. We have a fellow-feeling with Dr. Hall in his concluding remarks:

"Every encouragement should be given to the diligent and devoted investigator; every obstacle, every kind of injustice, every source of disgust and of indignation, should, for the sake of science, for the honour of our institutions, be removed. The physician who devotes himself to investigation especially makes a thousand sacrifices. His path requires cheering, and should not—as it need not be—unjustly obstructed or beset by thorns." (p. 94.)

If *we* have erred in this respect towards Dr. M. Hall, we here, and once for all, offer him our sincerest apologies; that we have made the *amende honorable*, by doing all in our power to promote the reception of his views when once convinced of their truth, we think our readers will freely admit.

II. We now proceed to notice that part of Mr. Newport's memoir which bears on the main subject of Dr. Hall's. On some future occasion we hope to do more justice to Mr. Newport than we have hitherto done, by noticing more at length the various admirable anatomical and physiological memoirs with which he has enriched the 'Philosophical Transactions' during the last ten years. Although it may be anticipated, from what has been stated above, that Dr. Hall will probably regard Mr. Newport's researches on the nervous system of the Articulata as of no great value in relation to his peculiar views, we are disposed to consider them of very great importance indeed; and we think he cannot but feel gratified in having what so many others as well as ourselves will look upon as a most important confirmation or corroboration of his doctrines, worked out by an inquirer of such acknowledged accuracy, and whose claims to physiological discovery are only second to his own.

The evidence adduced by Mr. Newport, in the paper whose title is prefixed to this article, of the existence of a distinct set of nerves ministering to reflex action, appears to us of the most satisfactory character, and such as it is scarcely possible to withstand. It may be asserted, however, that this evidence only applies to the Articulated classes; and that it affords no support to the idea that such nerves exist in Vertebrated animals, in which they have not yet been demonstrated. But upon the same reasoning it might be asserted, that we have no ground to believe in the existence

of distinct sensory and motor nerves in the Articulata, because their separate existence has only been proved in Vertebrata;—the fact being, that the four sets of nerves, of whose existence we feel well assured, are differently bound up together in these two groups of animals, as the following diagram will show:

In VERTEBRATA.	*Distinct Classes of Fibres.*	In ARTICULATA.
Afferent fibres, united in *posterior* roots of spinal nerves.	1. Sensory 2. Volitional	Form continuous fibrous tract passing on to the *brain*.
Efferent fibres, united in *anterior* roots of spinal nerves.	3. Excitor 4. Motor	Form distinct system of nerves, connected with *ventral* ganglia.

In the *posterior* roots of the spinal nerves of Vertebrata both classes of *afferent* fibres,—those which are merely excitors of reflex action, and those which convey sensory impressions to the brain, are bound up together; and in their *anterior* roots both classes of *efferent* or *motor* fibres are bound up together,—those which excite the muscles to reflex action, and those which convey to them the determinations of the will. If we had no other anatomy of the nervous system to look to, we might never be able to prove satisfactorily that this double function exists in each root. But in the articulated animals we have a different arrangement; the excitor and motor nerves of the reflex system being anatomically distinguishable from those which minister to sensation and volition, although their sensory and excitor nerves cannot be distinguished as *afferent* fibres from the two classes of motor or *efferent*.

It is probably well known to many of our readers, that, in his former papers, Mr. Newport had described the nervous column of the articulata as consisting of two very distinct *tracts*; one of these containing white or fibrous structure only, and passing continuously *over* the ganglia; the other being studded with ganglia (each ganglion containing gray matter or that which is analogous to it,) at intervals. From both these tracts proceed fibres, which enter the roots of the nerves; every one of which has, therefore, a connexion with each division of the nervous cord,—the ganglionic and aganglionic. By Mr. Newport this double connexion was formerly viewed as analogous to the double connexion of the spinal nerves with the spinal cord of vertebrata; the roots that enter the ganglionic column (which is the nearest to the ventral* parietes of the animal) being regarded by him as analogous to the posterior roots of the spinal nerves, and therefore sensory; whilst those that are connected with the aganglionic column (which is the one nearest the visceral cavity) were considered as analogous to the anterior roots of the spinal nerves, and therefore motor.

On the other hand, Dr. Carpenter was led, by his comparison of the nervous system of the Articulata with that of the Mollusca, and by his desire to find a justification (if possible) for the doctrine of a distinct system of excito-motor nerves in the anatomy of the Invertebrata, to attribute very different functions to these parts respectively. Taking the anatomical statements of Mr. Newport as his chief guide, he regarded the white or fibrous tract as exclusively of *cerebral* origin, establishing the relation between the cephalic ganglia and the nerves of the body; and as he restricted to these ganglia alone the functions of sensation and

* It is now generally understood that the body of an articulated animal is altogether inverted; so that its so-called *ventral* surface is really its dorsum.

volition, he regarded this tract and the branches proceeding from it as the *sensori-volitional* system of nerves. On the other hand, supposing the nerves which enter the ganglionic tract to be exclusively connected with its ganglia, and finding in the actions of decapitated and divided articulata ample proof of the high development of reflex phenomena in that group, he regarded the ganglionic column, with the branches proceeding from it, to constitute the *excito-motor* system of nerves.

The views to which Mr. Newport has been led by his recent inquiries harmonize most completely *in principle* with those put forth by Dr. Carpenter, though differing from them in certain details. The points of agreement and difference will be discernible from the extracts we shall give from this valuable paper; but we may as well briefly state them *in limine*. Mr. Newport's more recent anatomical inquiries, which have been prosecuted with means of research superior to those formerly in his possession, have led him to the discovery that, in the ganglionic column itself, two very distinct orders of fibres exist, besides those commissural fibres which unites its two sides. Of these, one set appears to be as continuous between the cephalic ganglia and the roots of the nerves, as are the fibres of the aganglionic tract, and must therefore be regarded as belonging to the sensori-volitional system, not to the excito-motor. And he considers it not improbable—although he has not been able to substantiate his opinion by experiments,—that *these* are the *sensory* fibres; whilst those of the *aganglionic* column are *motor*. Hence he in some degree holds to his former opinion; and we doubt not that Dr. Carpenter would be ready to agree with him on this point: since the essential doctrine entertained by the latter was, that *all* the fibres that connect the nervous with the *cephalic* ganglia are sensori-volitional, whilst those which connect them with the *ventral* ganglia are purely reflex,—a doctrine which is not in the least degree invalidated by the discovery, that *some* of the fibres believed by Dr. C. to belong to the latter system must be transferred to the former. In the existence of a *distinct set* of fibres, connected *only* with the *ventral* ganglia, and ministering exclusively to reflex action, Mr. Newport is now as firm a believer as Dr. C.; and the exactness of his anatomical analyses of the ventral cord, and of the inferences to which he has been led by numerous well-devised experiments, seem to place the correctness of this view beyond all reasonable doubt.

One other point may be here best adverted to. Mr. Newport's researches lead to the belief that in no instances do the nervous fibres *terminate* in ganglionic matter by free extremities. He finds them, while *passing through* the mass of nucleated cells intermingled with a plexus of blood-vessels (of which this substance appears essentially to consist), undergoing considerable changes in their aspect; but after they have emerged, they recover their usual appearance. So that it seems as if the afferent and efferent fibres were really continuous with each other, the change in their function, as well as in their direction, being effected during their passage through the gray matter: just as the arteries and veins are continuous, the change in the character of the fluid they convey, as well as in the direction of its movement, being effected during its transit through the capillaries. The inquiries of other observers have lately seemed to tend towards the same view; and it seems to explain much, that it would otherwise be difficult to reconcile with our notions

of the distinct system of excito-motor nerves, in the researches of Dr. Stilling on the structure of the spinal cord, of which we give an account in another article.

As we are necessarily limited as to space, we shall not make any extract from Mr. Newport's account of the aganglionic column, which contains no novelty of importance; but shall proceed at once to his description of the ganglionic tract:

"The *inferior longitudinal*, or *ganglionic* set of fibres of the cord, affords many interesting considerations. It is placed, exactly as in insects, on the under surface, but like the upper series it is narrower than the whole cord, of which it forms a part. It is formed of a longitudinal series of fibres, like the upper tract, beneath which it is placed, and from which it is divided by some of the fibres that pass transversely through the cord, and which enter into the composition of the nerves from the ganglion on either side. It appears also to receive filaments from the upper series, and perhaps others are sent from it to the upper, thus decussating each other in the middle substance of the cord, where these two longitudinal series are in close apposition; since it is almost impossible, even in the large nervous cord of Scolopendra, to separate these two tracts from each other, although their distinctness is evinced in their relative size and longitudinal lines of separation. But there is one fact of great interest in regard to this ganglionic series of fibres. Almost the whole of the fibres of which it is composed are traceable, in the Iulidæ, directly through each enlargement of the cord, which they mainly assist to form. At the anterior part of each enlargement the diameter of each fibre, or fasciculus of fibres, appears to be slightly increased, and its structure becomes more softened and delicate. While passing through these ganglionic enlargements, occasioned chiefly by their own increased diameter, the fibres take a slightly curved direction outwards, and then inwards, but are reduced to their original size, and assume the longitudinal direction on again forming the aganglionic portion of this tract of the cord." (p. 249.)

The fibres described in this extract, as well as those of the aganglionic column, appear to belong to the sensori-volitional system. We now quote Mr. Newport's accounts of those which seem to minister exclusively to reflex action. These fibres, which were previously undescribed, form the sides of the cord, in the interspace between the ganglia, or between certain nerves distributed from them; and are termed by Mr. Newport *the fibres of reinforcement of the cord*. The great importance of this anatomical fact leads us to extract the description in full, although at the risk of exceeding our limits.

"*The fibres of reinforcement of the cord* form the lateral portions of the whole nervous cord of the body, and enter into the composition of all the nerves. They constitute, as it were, circles of nervous communication between two nerves that orginate from the cord at a greater or less distance; and form part of the cord in the interval between these nerves, and bear the same relation to the segments, individually, which the cord itself does to the whole body. They form part of the nervous trunks which come off from its upper, or aganglionic tract, as well as of those which proceed from the ganglionic enlargements in the lower, and in each instance they bound the posterior side of one nerve and the anterior of another, to which they proceed along the sides of the cord, forming in the interspace, a part of its structure. Each fibre may thus be traced from its peripheral distribution, in the structures of the external surface of the body, inwards, along the course of the nerves, on their posterior surface, to the cord, where its direction is altered from that of the nerve transversely inwards, to that of the cord on which it is reflected, and passes longitudinally backward; thus forming a part of its external surface until it arrives at the root of the nerve to which it is to be distributed, and along which it again passes transversely outwards, bounding the

anterior side of the nerve to its distribution on the lateral surface of the body. These fibres of reinforcement form a large proportion of the whole cord, and enter into the composition of the upper, anterior, and part of the inferior surface of the root of every nerve, in their course inwards to the cord; and of its posterior and inferior surface on their again proceeding outwards. In this manner these fibres of reinforcement connect all the nerves of the cord on one side of the body, as the corresponding fibres do those on the opposite side. They form, as it were, double, treble, or quadruple circles, one within the other. Thus the fibres that pass inwards along one nerve may proceed along the cord to pass outwards again on the front of a second, a third, or a fourth, thus linking the segments in one continued series of nervous communications, independent of the brain. But these communications exist only between nerves on the same side of the body, and not between those on the opposite. The *commissural* nerves connect the opposite sides of each individual segment, as those of *reinforcement* do the same sides of two separate segments.

"Every nerve from a ganglionic enlargement of the cord is thus composed of *four sets* of fibres, an upper and an under one, which communicate with the cephalic ganglia; a transverse or *commissural*, that communicate only with corresponding nerves on the opposite side of the body; and a lateral set that communicate only with nerves from a ganglionic enlargement on the same side of the body, and form part of the cord in the interspace between the roots and the nerves. It is by the successive addition of these lateral portions of the cord, that its size is maintained almost uniformly throughout its whole length in the elongated bodies of the Myriapoda. On examining the cord very closely, I have reason to believe that the upper and inferior sets of longitudinal fibres, the ganglionic and the aganglionic, are somewhat smaller at their posterior than at their anterior extremity, a circumstance readily understood in the fact that successive series of filaments are given off from them at each distribution of nerves from the ganglonic enlargements; while the relative size of the lateral portions of the cord appears to be greater in the posterior than in the anterior. On this account I have named these lateral fibres *fibres of reinforcement of the cord.*

"In regard to the identification of these fibres, it may be well further to state, that their separate existence is indicated chiefly at the postero-lateral margin of the ganglia where they are seen to form part of the nerves and cord without passing upwards to the brain. In other parts of their course they are not distinguishable by colour, and very rarely by any longitudinal line of separation, from the fibres which form the inferior longitudinal series, or portion of the cord, to which they are approximated; but from which they are believed to be distinct, from the fact, that they do not ascend with them to the brain. Their function must be regarded only as *reflex;* entirely independent of sensation, but capable of being excited into action by external causes. The existence of these lateral fibres in the cord may now fully explain the reflected movement of parts anterior or posterior to an irritated limb on the same side of the body, as the commissural ones do the movement of parts on the side opposite to that which is irritated." (pp. 250-2.)

In order to demonstrate the respective functions of these systems, a number of well-devised experiments were performed by Mr. Newport; the results of which we cannot but regard as most satisfactory. We shall quote the *fifth* as one of the most striking and conclusive:

"*Experiment* 5. The cord alone was divided in the *fourteenth* and also the *twentieth* segment, and the intervening portion was destroyed by breaking it down with a needle. The animal exhibited in the anterior part of its body all the evidences of perfect volition. It moved actively along, turning itself back on either side repeatedly, as if to examine the anterior wounded portion, which it felt again and again with its antennæ, and when attempting to escape, frequently turned back as if in pain and aware of some hindrance to its movements, but it seemed perfectly unconscious of the existence of the posterior part of its body,

behind the first incision. In those segments in which the cord was destroyed, the legs were motionless, while those of the posterior division, behind the second incision, were in constant, but involuntary motion, the movements being similar to those of walking or running, uniformly continued, but without any consentaneous action with those of the anterior part, by which locomotion was performed, dragging the posterior divisions of the body after them. When the animal was held by the posterior segments, reflex actions were excited in the legs, and powerful contractions and gyrations of the whole animal were performed in those segments; but these movements appeared to be entirely the result of reflex actions of the muscles, since exactly similar ones took place in the whole body in decapitated specimens. At the expiration of *twelve* hours the most perfectly voluntary acts were performed by the head and anterior division of the body, such as locomotion forwards or to either side, avoidance of any obstacle, touching it with the antennæ, which were in rapid action as in an uninjured animal, and attempting to reach and to climb up an object presented to it, but not in immediate contact with it. But reflex movements alone existed in the posterior division, in which the legs were very slowly moved, even when the animal was not progressing. Brisk actions were now more easily excited in them than at first, either by contact with the segments, by irritation of one or two of the legs themselves, or by a sudden current of air. By these means, when the animal was lying still, actions were immediately excited in all the legs of the posterior part of the body anterior and posterior to those which were irritated, and these actions were induced in those of both sides of the body, but appeared to commence on the opposite side, in the legs corresponding to those which were first irritated. In *eighteen* hours the anterior part of the body was quite dead, no motions whatever could be excited on it, either voluntary or reflex; but reflex actions were then readily excited in the posterior, and also slightly so by mechanical irritation, even at *twenty-four* hours." (pp. 267-8.)

This experiment, and most of the others, were made upon the *Iulus*, one of the vermiform myriapoda, in which the cephalic ganglia are small in proportion to the rest, and the excito-motor system is evidently the predominant one. But they were repeated, with corresponding results, upon one of the higher species, the *lithobius forficatus*, in which, from the peculiar structure of the head, the cerebral ganglia could be removed from the body, without removing the medulla oblongata (or penduncle of the ganglia) from which the nerves are given to the parts of the mouth. The following are Mr. Newport's general conclusions from the whole:

"These experiments seem to lead to the conclusion that the seat of volition is solely in the supra-œsophageal ganglia or brain of these animals, since all direction of purpose, all avoidance of danger, all control over the movements of the body, either of speed or change of direction, are lost when these are much injured or removed. Volition ceases quickly when they are severely wounded, and is greatly diminished even when one only is slightly affected. This latter fact is indicated by the loss or diminution of purpose, and by the gyratory movements of the body. The experiments seem also to show that sensation may remain after the injury or removal of one lobe of the brain, as was proved by the retraction of the antenna when slightly touched on the uninjured side of the head, and by the cleansing and excited act of drawing it constantly through the mandibles; and further, that pain is felt when the cerebral lobes are injured, as when the needle was applied to them after the antennæ had been removed. They lead also to the conclusion, that all the phenomena which occur in the posterior parts of the body after the brain and cord have been separated are reflex or excited, and that these are most intense at the two extremities of the cord—the medulla oblongata, and the terminal ganglion; and further, that the reflex phenomena are always excited and do not occur spontaneously, and that their intensity is greater in proportion

to the stimulus applied, and gradually diminishes until they entirely cease, or are re-excited, precisely as already shown by Dr. Hall in the Vertebrata.

The experiments both on the Iulus and Lithobius seem further to show, that the reflected movements cease first in the anterior part of the cord and its ganglia, and that they are retained longest in the posterior; that the movements are most powerful and continue longest when the cord is entire, the brain alone being separated from it; and that they entirely cease sooner in proportion to the greater number of parts into which the cord is separated: further also, that the reflex phenomena are less readily excited in the anterior part of the cord, while it is still in connexion with the brain, and that they cease entirely soon after the cessation of volition in that organ; as in those experiments in which only a very short portion of cord was removed with it from the body.

"Many of the phenomena are precisely similar to those which have heretofore been observed in the Crustacea. They agree in the circumstance that violent contractions of the segments and limbs, both anterior and posterior to a ganglion, are induced by irritation of that ganglion, both when connected with the brain and when insulated from it, thus proving these movements, in the latter instance, to be reflex; but there is as yet no direct *proof* that sensation does not also exist in these ganglia.

"The general results of these experiments tend to confirm the belief that the fibres now pointed ont in the composition of the cord and ganglia, and which cannot be traced to the brain, are those by which these movements are executed independently of that organ; and further also, that the reflex phenomena are most intense, most easily induced, and are of longest duration, in those animals of low organization, in which the volume of brain bears the smallest proportion to that of the whole nervous system, in which also volition and sensation are of small amount, and which have the body formed of the greatest number of similar uniform parts or segments." (pp. 271-2.)

An important addition is made in a note.

"While this paper has been passing through the press, I have repeated these experiments, on the functions of the brain and cord, with still more conclusive results on the Cleoptera, Orthoptera, Hymenoptera, Neuroptera, Diptera, and other hexapod insects. The cord was divided between the first and second pairs of legs. The two posterior pairs of legs were immediately deprived of volition, and exhibited only reflex actions, while the anterior pair gave marked indications of being as completely under the influence of volition and sensation as in the uninjured animal. The cord was then divided between the first pair of legs and medulla oblongata, when these legs also were deprived of volition, and exhibited only reflex actions like the posterior.

"Other experiments made on the brain itself, by removing that organ, or by simply separating it from the medulla oblongata and cord, without decapitating the insect, fully confirmed the experiments on the Myriapoda, in proving that the supra-œsophageal ganglia have the functions of a true brain, and are the sole seat of sensation and volition; and that although, when this organ is removed or is insulated from the cord, a regular, combined, and consentaneous series of muscular actions can be excited in the limbs, and locomotion induced, these acts are then entirely automatic, and are performed without the intervention of sensation or volition." (p. 272.)

We shall only add the following passage, extracted from Mr. Newport's general summary, which directs attention to a very important subject that is now attracting much attention,—the connexion of the *nutrition* and *vital actions* of a part. This subject was noticed by Mr. Newport in a former part of the memoir, when describing the cord and changes of the nervous system in *polydesmus* and *geophilus*. We, ourselves, have long entertained the same notion, believing that the ganglionic matter, if the centre of the *actions* of the nervous system, must be

the centre of its *nutrition* also. But this ganglionic matter must be looked for, not only in the *centres* of the nervous system, but in its *periphery*, the spots in which the afferent fibres originate.

"The ganglia of the cord are regarded not only as analogous, anatomically, to the enlarged portions of the cord in Vertebrata, but, physiologically, as centres of reflexion, agreeably to the views of Dr. Carpenter; and they also possess a still more important character and function in the nervous system, that of being the centres of growth and nutrition to the cord and nerves, the nuclei contained in them being perhaps the sources of supply and nourishment. This is shown from the fact that, in these parts, the fibres of the cord are softer and larger than in the rest of their course; and are elongated during the growth of the body, and the development of new segments; as is seen in the *Polydesmidæ* and *Geophilidæ*, families from the two divisions of Myriapoda. These additional facts fully accord with the already ascertained mode of development *by extension*, or simple growth of the segments." (p. 300.)

ART. XI.

An Introductory Discourse on the Duties and Conduct of Medical Students and Practitioners. Addressed to the Students of the Medical School of St. George's Hospital, Oct. 2, 1843. By Sir B. C. BRODIE, Bart. F.R.S. &c. &c.—*London*, 1843. 8vo, pp. 34.

IF this pamphlet were for sale we should content ourselves with simply stating that it contains matter which it behoves every medical man, whether pupil or practitioner, to read, learn, and inwardly digest, and recommend its purchase accordingly. But as it is not so procurable, we feel it incumbent on us to give a short account of it and make a few extracts from it, for the benefit of our readers.* It cannot but be interesting to know the opinions of such a man as Sir Benjamin Brodie on what he considers the best means for students and practitioners to acquire knowledge and attain prosperity,—a man who has himself obtained an ample supply of both. While Sir Benjamin's age and long professional experience afford him the amplest means for judging in this matter, his station in the profession allows him freely to state his opinions, without the possibility of having any other motive attributed to him but that he believes them to be just, and hopes they may be useful. By his own energy and labour he has reached those sunny heights of practice—those "templa serena"—whence he is able, in perfect tranquillity and without bias,

"Despicere........alios, passimque videre
Errare, atque viam palanteis quærere vitæ,
Certare ingenio, contendere nobilitate,
Nocteis atque dies niti præstante labore
Ad summas emergere opes rerumque potiri."

We may receive his opinions on professional subjects, therefore, with just as much confidence in their authenticity as if they were delivered from a deathbed, as the last legacy of a good and grateful man to a profession which he had already benefited so much, and by which he had himself so much benefited.

As befitted the occasion of its delivery, and, we may add, the character of the lecturer, this Discourse is distinguished by plain, sound, commonsense views of plain and common things, such as his hearers are already conversant with, or must speedily encounter in the path of their every-day

* Since this was in type, the Discourse has been published.

labours. There is no attempt at fine writing, no striving for effect, no dwelling on doubtful or useless points, no fine speculations or fine sentiments,—but plenty of good practical, work-day wisdom, such as will stick by a man, and be found profitable in the actual business of life. Although the author has put on his title-page, as a motto, one of the golden sayings of Pythagoras, he seems to have been guided quite as much, in the composition of his discourse, by the saw of a British sage:

> "———— To know
> That which before us lies in daily life
> Is the prime wisdom: what is more, is fume,
> Or emptiness, or fond impertinence;
> And renders us, in things that most concern,
> Unpractised, unprepared, and still to seek."

Sir Benjamin shrewdly warns his youthful auditors against the dangerous mistake into which many are apt to fall,—that their present conduct, whether good or bad, will be little noticed now, and buried in oblivion hereafter,—forgetting that those who will have to judge of them as men are their present companions.

"In future days you will find that it is not on accidental circumstances, but on the character which you have made as students, that your success as practitioners and as men engaged in the business of the world, will mainly depend. By the time that you are sufficiently advanced for your lot in life to be finally determined, the course of events will have wrought mighty changes among us. Of those who are now the most conspicuous in station and the most influential in society, many will have altogether vanished from the scene of their former labours; and others will be to be found only in the retirement of old age. Younger and more active spirits, your own contemporaries, and those a little older than yourselves, will have occupied their places; and the tribunal by which you will be judged hereafter will be composed of a different order of individuals from those to whose favorable opinion you would at this moment be most anxious to appeal." (pp. 6-7.)

The necessity of acquiring knowledge is of course dwelt on, and forcibly; but the importance of study is justly estimated as far beyond its mere utilitarian value as a means of storing the mind and memory:

"But he who has neglected his education must, as it were, begin anew; and he will find, when it is too late, that no combination of energy and talent will enable him to rise to the level of those who were in the beginning his more diligent competitors. He will, moreover, labour under another and still greater disadtage. One business of education is to impart knowledge; but another and still more important one is to train the intellectual faculties. To acquire the habit of fixing the attention on the object before you, of observing for yourselves, of thinking and reasoning accurately, of distinguishing at once that which is important from that which is trivial, all this must be accomplished in the early part of life, or it will not be accomplished at all." (pp. 7-8.)

In the following passage how admirably are contrasted the relative condition of the man who knows and the man who knows not his profession! Every one of any standing in the world must have verified in his own experience the accuracy of the picture of the conscientious but incompetent officer, and must have sympathized in his misery:

"Your future fortunes are placed in your own hands; you may make them or mar them, as you please. Those among you who now labour hard in the acquirement of knowledge will find that they have laid in a store which will be serviceable to them ever afterwards. They will have the satisfaction of knowing that in practising their art for their own advantage, they are at the same time making them-

Like Dr. Watson,* and all men of good sense and good feeling, Sir Benjamin Brodie looks upon physic not only as a noble profession, but as one whose members have no right to complain of their position in society, or of the nature or amount of the rewards to which it conducts its votaries. His mind is too masculine to sympathise with that morbid discontent in which so many medical men are apt to indulge, when comparing it with some other professions.

"If it be your ambition," he says, "to obtain political rank, or to have that sort of reputation which a political life affords, you will be disappointed; for, as I have already observed, our profession has nothing to do with politics. It belongs to private life, and the only other association which it has, is that of science." (p. 26.)

But, he adds,

"I know of no profession that is worthy of being pursued which does not require as much exertion, as much labour, as many sacrifices, as that in which you are engaged; and I also know of none in which he who has the necessary qualifications is more sure of being rewarded for his labours." (p 26.)

"It must be a great satisfaction at the close of life to be able to look back on the years which are passed, and to feel that you have lived, not for yourselves alone, but that you have been useful to others. You may be assured also, that the same feeling is a source of comfort and happiness at any period of life. *There is nothing in this world so good as usefulness.* It binds your fellow-creatures to you, and you to them: it tends to the improvement of your own character, and it gives you a real importance in society much beyond what any artificial station can bestow. It is a great advantage to you, that the profession in which you are about to enter, if properly pursued, is preeminently useful. It has no other object; and you cannot do good to yourselves without having done good to others first. Thus it engenders good feelings and habits; and I know of no order in society, who, taken as a whole, are more disinterested, or more ready to perform acts of kindness to others, than the members of the medical profession." (pp. 27-8.)

"There are some employments which bring those who are engaged in them in contact more especially with the bad qualities of mankind—their pride, their arrogance, their selfishness, their want of principle. It is not so with your profession. All varieties of character will be thrown open to your view; but nevertheless you will see, on the whole, the better side of human nature—much indeed of its weakness, much of its failings, much of what is wrong, but more of what is good in it. Communicating, as you will probably do, with persons of all conditions, you will be led to estimate others according to their intrinsic qualities, and not according to those circumstances which are external to themselves: you will learn that of the various classes of which society is composed, no one is preeminently good or preeminently bad; and that the difference is merely this, that the vices and virtues of one class are not exactly the vices and virtues of another........ All this is good for your own minds." (pp. 29-30.)

On the important subject of professional emolument Sir Benjamin speaks with his usual good sense. The sole object is not "rem, quocunque modo rem;" but still the attainment of a competency or even of wealth is a legitimate object, so long as it is consistent with honorable conduct and the preservation of self-respect.

"To obtain such a competency as will place yourselves and your families above the reach of want, and enable you to enjoy such of the comforts and advantages of life as usually fall to the lot of persons in the same station of life with yourselves, is undoubtedly one of your first duties, and one of the principal objects to which your attention should be directed: but, nevertheless, let it never be forgotten that this forms but a part, and a small part, of professional success. If indeed money

* See the extract from his lectures in our present Number, p. 122.

were the only object of life, if to enjoy the respect of others and the approbation of your own conscience, to feel that you are doing some good in the world and that your names will be held in esteem when you are gone out of it, if these things were to form no part of your ambition, then indeed you might possibly have your ambition gratified by pursuing a different course from that which I have pointed out. You might be unscrupulous in your promises, undertaking to heal the incurable, making much of trifling complaints for your own profit, claiming credit where none belongs to you .... But [adds Sir Benjamin,] generous feelings belong to youth, and I cannot suppose that there is a single individual present who would not turn away with disgust from any advantages which were to be obtained by such means as these." (pp. 31-3.)

"Never pretend to know what cannot be known; make no promises which it is not probable that you will be able to fulfil: you will not satisfy every one at the moment, for many require of our art that which our art cannot bestow; but you may look forward with confidence to the good opinion of the public, which time will bring as your reward, and to act otherwise is to put yourselves on a level with charlatans and quacks." (p. 31.)

But even, argues our author, if you were so degenerate and base as to forsake the fair and open path of professional honour for the dark and crooked ways of quackery, in the hope of obtaining wealth, most probably you would be disappointed :

"Your future experience of the world, if you use it properly, will but confirm you in these sentiments; for you will discover that of those who strive to elevate themselves by unworthy artifices, it is only a very small proportion who obtain even that to which they are contented to aspire; and that the great majority are altogether disappointed, living to be the contempt of others, and especially so of their own profession, and for the most part ending their days in wretchedness and poverty." (p. 39.)

So true is it here as everywhere, that honesty is the best policy. And doubtless, if we could know the real sentiments of even the most successful quacks, at the close of their career, we should find that if they did not admit that their quackery had been a great crime, they would say, as Talleyrand said of Napoleon's invasion of Spain, that it was worse—it was a great mistake. The same cleverness and industry, devoted to legitimate professional pursuits would, in all probability, have raised them to a higher degree of even worldly prosperity, while the honours or general respect they might have acquired along with this, (to say nothing of religion or conscience,) would have outweighed a thousandfold, in their effect on personal happiness, all they had attained by their despicable and degrading tricks. And Sir Benjamin might have ventured to assure his auditors that while themselves slowly but gradually advancing in their honorable career, they will not only pass by their degenerate competitors, but will in all probability live to see even the most flourishing of the actual stock of these vile Arachnidans of the medical kingdom—whether throwing out their dirty webs from the EYE, or the EAR, or the THROAT, or the LUNGS, or from regions yet more emblematic of their obscene and disgusting arts—vanish in the same sink of oblivious ignominy which had swallowed up their most famous predecessors.

Art. XII.

Recherches sur les Echinocoques, chez l'Homme et chez les Animaux. Par Eugène Livois, d.m.p. &c.—*Paris*, 1843. 4to, pp. 126.
Researches on the Echinococcus in Man and other Animals. By Eugène Livois, d.m.p. &c.—*Paris*, 1843.

The title of this elaborate treatise will probably not be an attractive one for any but professed helminthologists; but the short analysis which we shall give of its contents will show that they possess a high degree of interest for every medical reader: the author's object being to unveil the real nature of those very obscure and perplexing bodies known under the name of *hydatids* or *acephalocysts*. We cannot but think that in this he has completely succeeded,—that is, if his statements are to be implicitly received; and as he informs us that his researches have been prosecuted under the guidance of M. Rayer, and have been communicated to the Anatomical Society of Paris (of which Dr. Livois is secretary) previously to their publication, we feel much inclined to give credit to them, and the more readily because they tend to reconcile the discrepant accounts given by previous observers.

In giving an account of Dr. Livois' discoveries we shall not follow the order of his memoir; since a large part of this is made up of the statements of the various helminthologists under whose observation the echinococcus has fallen; but we shall endeavour, as briefly as may be, to show in what his discovery consists, by comparing our previous knowledge on the subject with that which we have gained through his researches.

Almost every anatomist is familiar with the bodies formerly termed *hydatids*, but usually designated, since the time of Laennec, as *acephalocysts*; and many discussions have been raised on the question, whether they ought to be considered as independent organisms, or as morbid products of the animal in which they are found. The latter was the opinion of Rudolphi; the former that of most other helminthologists. Our author (with others who have written on the question) considers that two very distinct things have been confounded together,—the real acephalocyst and certain forms of serous cysts; and that these are to be distinguished by their relations to the surrounding tissues,—the true acephalocyst having no adhesion whatever, although inclosed in a more or less distinct cyst which is formed around it, as round any other foreign body; whilst the serous cysts always have some degree of adhesion to the enveloping structures, although this may be but a narrow peduncle. Under this last category he ranges the cysts so frequently found in the plexus choroides, as well as the so-called hydatid mole; which he agrees with Professor Simpson in regarding as a degenerated form of the placenta.

In order to put our readers in possession of the general views previously entertained of the nature of the acephalocyst, we shall quote the account of it given by Mr. Owen, in his article *Entozoa*, in the 'Cyclopedia of Anatomy and Physiology:' "The acephalocyst is an organized being, consisting of a globular bag, which is composed of condensed albuminous matter, of a laminated texture, and contains a limpid colourless fluid, with a little albuminous and a greater proportion of gelatinous substance. The properties by which we recognize the acephalocyst as an independent

or individual organized being, are, first, growth by intrinsic power of imbibition; and, secondly, reproduction of its species by germination. The young acephalocysts are developed between the layers of the parent cyst, and thrown off either internally or externally, according to the species." Now on this we would observe, that what are here stated as the characters establishing the *individuality* of the being, are also possessed by every single cell entering into the composition of the organism; for the cells of the secreting and other structures, like those of which the entire embryonic mass is at first composed, grow by their own intrinsic power of imbibition, and have the power of reproducing themselves by germs developed within their cavity. Indeed, Mr. Owen himself has since modified the opinion just quoted; for we find in his recently-published Hunterian Lectures the following passage: "The knowledge that we now possess of the primitive embryonic forms of all animals and of all animal tissues, places us in the position to take a true view of the nature of the acephalocyst. It seems to me to be most truly described as a 'gigantic organic cell,' not as a species of animal, even of the simplest kind." But the evidence in regard to the latter part of the statement is by no means satisfactory. Of the *acephalocystis endogena*, or pill-box hydatid of Hunter, (the species found in man,) Mr. Owen says: "This species is so called from the circumstance of the gemmules being detached from the internal surface of the cyst, where they grow, and in like manner propagate their kind; so that the successive generations produce the appearance described by Hunter and other pathologists. The membrane of the cyst is thin, delicate, transparent, or with a certain pearly semi-opacity; it tears readily and equally in every direction; and can, in large specimens, be separated into laminæ. The vesicles or gemmules, developed in the parietes of the cyst, may be observed of different sizes,—some of microscopic dimensions, others of a line in diameter, before they are cast off." Now, if the statements of Dr. Livois are to be relied on, it would seem that no good microscopic examination has ever been made of these so-called gemmules or granulations; for he represents them, as we shall immediately see, to be of a nature entirely different from the germs of new cysts.

To the previous quotation we shall add Mr. Owen's account of the echinococcus, to the details of which we shall presently have to advert. "The genus *echinococcus* is admitted by Rudolphi into the order *cystica*, less on account of the external globular cyst, which, like the acephalocyst, is unprovided with a head or mouth,—than from the structure of the minute bodies which it contains, and which are described as possessing the armed and suctorious head characteristic of the *cœnuri* and *cystecerci*. It must be observed that Rudolphi does not ascribe this complicated structure to the vermiculi of the human *echinococcus* on his own authority, and speaks doubtfully respecting the coronet of hooklets and suctorious mouths of the vermiculi contained in the cyst of the echinococcus of the sheep, hog, &c. Müller has recently described a species of *echinococcus* voided with the urine by a young man labouring under symptoms of renal disease. The tunic of the containing cyst was a thick white membrane, not naturally divided into laminæ; the animalcules floating in the contained fluid presented a circle of hooklets and four obtuse processes round

the head; the posterior end of the body obtuse; some of them were inclosed in small vesicles floating in the large one; others presented a filamentary process at their obtuse end, probably a connecting pedicle which had been broken through." A very similar description has been given by Mr. Quekett and Mr. Curling, of an *echinococcus* found by the latter in cysts developed in the human liver. Mr. Owen gives the following account of his own observations upon the species known as the *echinococcus veterinorum*, of which he examined several individuals soon after they were extracted from the recently-killed animal, a sow, in which they existed in great abundance in cysts in the abdomen. "The containing cysts were composed of two layers, artificially separable; both of a gelatinous texture, nearly colourless, and sub-transparent, the external one being the firmest. The contained fluid was colourless and limpid, with a few granular bodies floating in it; and immense numbers of extremely minute particles applied but not adherent to the internal surface of the cyst. On examining these particles with a high magnifying power, they were seen to be living animalcules of an ovate form, moving freely by means of superficial vibratile cilia, having an orifice at the smaller end, from which a granular and glairy substance was occasionally discharged; and a trilobate depression at the greater and anterior extremity, produced by a retraction of part of the body. I watched attentively and for a long period a number of these animalcules, in the hope of seeing the head completely protruded; but without success. On compressing the animalculæ between plates of glass, a group of long, slender, straight, sharp-pointed spines became visible within the body at its anterior part, and directed towards the anterior depression, precisely resembling the parts described and figured by Ehrenberg as the teeth of the polygastric infusories; the rest of the body was occupied by large clear globules (the stomachs?) and smaller granules. Animalcules thus organized cannot, it is evident, be classed with cystic entozoa, but must be referred to the polygastric infusoria." In Mr. Owen's Hunterian Lectures we find the following additional statement: "The *echinococci* from a small musk-deer, lately dissected at the college, closely resemble those of the hog; but being dead the cellated structure is not indicated, and could not be detected. Each tooth or spine presents an elongated triangular form, a small process extending from the middle of its outer margin, probably for the attachment of the protractor fibres." Dr. Livois, as we shall presently see, has been more fortunate in his opportunities of seeing the animal in its fully-extended form.

The discovery enunciated in the memoir before us is simply this,—that the *echinococcus*, instead of being one of the rarest parasites existing in the human body is among the most frequent, since this entozoon is found in great numbers *in every acephalocyst*. In other words, the true hydatid is nothing else than the containing cyst of a multitude of echinococci. The author considers himself warranted in this generalization, by the fact that after examining upwards of *eight hundred* acephalocysts, he has *in no instance* found the echinococci absent. They are met with, however, in different situations, according to their degrees of development. The granulations or gemmules adherent to the interior of the cyst, are clusters of echinococci, whose head is not yet protruded;

but when they have attained their full development they usually separate, and are found floating in the fluid of the sac. In general, the same cyst contains echinococci in both conditions; but sometimes the granulations are wanting, and all the parasites are free, escaping from the sac with the jet of its contained fluid, which is forced out, by the elasticity of its walls, when it is punctured. Hence their existence may easily be overlooked, if the fluid be not collected and examined. The following is Dr. Livois' account of hydatids as they exist in man:

"In the human subject, hydatids usually present themselves under the form of spherical vesicles; but amongst them some are occasionally found of a pear shape, or of an irregular form. It is very rarely that they are found existing solitarily in their cysts, nearly always a more or less considerable number is included in a common cyst. Thus there were 71 in the brain of a girl whose history is reported by Rendtorf; 143 in the kidney of a woman which has fallen under my own observation; and certainly more than 1000 in a vast cyst of the kidney, which M. Rayer was good enough to show me. In this last case the hydatids, which were pressed one against another, offered every variety of size, from that of a grain of millet to that of a large egg; *all these vesicles were free, and did not include any smaller ones.* All those which I examined, and their number was by no means small, contained echinococci; these were very numerous in the larger cysts, but were united in each of the smaller ones into a single group, containing four, five, or six individuals at most. The granulation resulting from this assemblage was very transparent, and was not readily distinguished, on account of its minute size, when looked for through the walls of the hydatid; so that it might easily, even under the microscope, have escaped notice, unless the examination were very carefully conducted. The small worms which were altogether non-adherent, had the same structure and dimensions in every case." (p. 82.)

Hence Dr. Livois concludes that the hydatid, or containing sac, increases in dimensions, as the contained echinococci multiply by reproduction. In regard to the origin of the sac, he does not offer any definite opinion; but speaks of it as *intermediate* between a veritable animal and a morbid product. We have a great dislike to these half-definitions, which seem to help us out of difficulties, whilst they really only substitute one form of words for another. The hydatid must either be an integral part of the organism in which it is contained, resulting from an abnormal development of one of its own cell-germs; or it must be of the nature of a false membrane, a product of the peculiar irritation occasioned by the parasite; or it must be a distinct animal, originating in a germ introduced from without. Now of these three opinions we incline to the second. We cannot suppose the hydatid to be a cell, because it seems to us impossible that the echinococci should find their way into it after it is once formed. We can scarcely imagine it to be a distinct animal, so entirely destitute is it of all claims to be regarded as an independent individual. And, as the observations of Dr. Livois seem to do away with the idea of its reproductive power, we see no valid objection to the idea that it is a product of morbid action. The anatomist can now point to numerous instances in which a pellucid membrane is formed by an action of the subjacent tissue, and without any structural connexion with it,—such is the basement or primary membrane forming the surface of the true skin and mucous membrane; and we do not see any difficulty, therefore, in regarding the hydatid cyst in a similar light.

It is not denied by Dr. Livois that hydatid cysts *may* be found without contained echinococci; this having been reported by Müller in the case already adverted to, and also by Gervais and Gluge. But, in these cases, they were in company with others in which these entozoa presented themselves; and it is quite possible that they may have actually contained entozoa, although these escaped observation from some of the causes just adverted to. But if the existence of true hydatids without echinococci should ever be clearly shown, there would be strong ground for the belief that, in consequence of some unknown influence, the contained entozoa had ceased to exist; since Dr. Livois assures us that, in upwards of 800 examinations, he never found the echinococci absent in a single hydatid.

The hydatids of the lower animals are solitary, instead of being multiplied as in man; that is, in each containing cyst there is but a single hydatid instead of a number. But whilst in man they are but rarely found in several organs at once, or even in several parts of the same organ, the contrary is the case with the lower animals,—hydatids often existing at the same time in the liver and lungs, or in the liver and spleen; and the liver being not unfrequently *riddled* with distinct cysts.

When removed from the body, hydatids soon begin to undergo changes which very much alter their appearance. They lose their transparency, and present an opaline aspect; and the membrane of which they are composed separates into laminæ, of which the exterior is easily torn off; whilst the interior spontaneously falls off in shreds, which float in the contained fluid, giving it a flocculent appearance. Sometimes the whole interior pellicle detaches itself at once; so that we find, as it were, one hydatid contained within another. The various post-mortem alterations which thus result have been attentively studied by M. Cruveilhier. The internal membrane, in detaching itself, carries with it the white granulations, which consist of the adhering echinococci; so that when the cyst alone is examined, no traces of them would be found,—thus affording an additional reason why their existence has so long escaped the notice of observers.

We have, lastly, to consider the structure of the echinococci themselves; and we shall first describe the fully-developed form which they occasionally present, when floating freely in the liquid of the cyst. This may be described as a flattened oval, with a constriction across the middle, and a projection at one extremity. The constriction divides it into what may be termed the head and the caudal vesicle; and the projection borne by the former may be designated as the proboscis. On this proboscis there is a double circular row of hooks, which Dr. Livois states to be forty-four in number; very much resembling that upon the anterior extremity of the *cysticercus*. Behind these hooks, and situated on the head itself, are four suckers, also closely resembling those of the cysticercus. But the caudal vesicle instead of being of great size, as in that of the entozoon, is here no larger than the head itself; it is seen to contain a considerable number of small globular or oval bodies, which are regarded by Dr. Livois as eggs or germs. But the form under which the echinococcus most commonly presents itself, and under which alone it has been recognized by many observers, is very different. The proboscis is drawn

back within the head, in a mode resembling the *inversion* of the finger of a glove; and the head itself is drawn within the caudal vesicle, so that the body is reduced to about one half its length, and the circle of hooks on the proboscis can be seen, at about its middle, through the thin parietes of the cavity in which they are imbedded. The anterior extremity now has a funnel-shaped orifice, leading to a canal, which can be traced down as far as the circle of hooks; this canal is due to the inversion of the head and proboscis, as becomes evident from the comparative instance just alluded to. It is in this unfolded state that the echinococci adhere together, in masses usually composed of from fifteen to twenty individuals, so as to form the little granulations that present themselves on the interior of the hydatid,—resembling, according to the description of Dr. Livois, the minute globules of air which adhere to the side of a glass of water. These granulations are easily detached, by agitating the containing cyst; and consequently they cannot be said to have a true adhesion to it. In a short time after the death of the animal in which these parasites occur, *they* seem to share its fate; probably in consequence of an incipient alteration in a state of the fluids. Soon after their death the echinococci begin to lose their transparency; and the circle of hooks, when drawn back within the body, ceases to be distinctly seen. The use of the hooks (in which Dr. Livois describes and figures the lateral projection recently noticed by Mr. Owen,) is evidently to attach the animals to the parietes of the cavity in which they live; that of the suckers is supposed by Dr. Livois to be more temporary, as they serve, in his opinion, to give support to the body whilst the proboscis is being protruded, and to fix it in such a manner that the hooks may be forcibly imbedded in the walls of the sac; which could not be done so long as the animal is floating freely in its fluid. We would suggest whether they may not be sufficiently protruded, in the animals which are grouped in clusters, to serve as the means of their adhesion to one another; this adhesion seems to be pretty strong, since the forms of the individual animals are often greatly changed by the pressure to which they are subjected.

It seems pretty clear that the reproduction of the echinococci takes place by means of ova; but the history of their development has not been traced by Dr. Livois. He states, moreover, that he has never seen any distinct movement in these animals; and on this point he is evidently at issue with Mr. Owen. We would suggest it as by no means impossible that the ciliary movement seen by the latter may be confined to a certain period of development, as it is in the case of many embryos of invertebrated animals.

It only remains to add, that Dr. Livois can recognize no distinction of species among the echinococci of man and of the lower animals; the same forms being presented by all. We commend this very interesting subject to the attentive examination of our pathological microscopists; in the hope that, by their united observations, the real value of this memoir may be speedily determined.

Art. XIII.

Essays on Determination of Blood to the Head. By Robert Hull, M.D. Physician to the Norfolk and Norwich Hospital.—*Norwich,* 1842. 8vo, pp. 200.

We had supposed, after the investigations of Dr. Abercrombie and other labourers in the same field of pathological inquiry, that scarcely any professional man could be so ignorant as not to know that the symptoms, vulgarly supposed to be indicative of an overflow of blood to the head, that is to say, of increased vascularity of the brain, are common to very opposite states of that organ. But in fact, if we go back to the ancient authorities in medicine, we shall find in their works undoubted evidence that they were perfectly aware of this fact, and that they applied remedies in such cases upon this principle with considerable tact and talent for discrimination. Thus, Galen divides headaches into acute and chronic, and subdivides each into several varieties; as for example, cephalalgia from a hot and from a cold intemperament; cephalalgia from plethora, to be relieved by venesection; and the same from sympathy with the stomach and liver, to be cured by emetics and cholagogues. Haly Abbas makes mention of intense headach from sympathy with the uterus, after miscarriages, &c. The ancient authorities also treat of the lethargic affections in such a manner as shows that they did not set them all down as being the same in kind and requiring no diversity of treatment. But still, notwithstanding all the information to be derived from professional authorities, both ancient and modern, it must be admitted that there is ample room for further improvement in the pathology and therapeutics of this class of diseases, as cases but too frequently occur in practice which puzzle the most sagacious and intelligent practitioner to determine the nature of the disease, and point out the line of treatment most suitable to it. Whether the work under review contributes anything to improve our knowledge on these important points, our readers will be best able to judge after we have laid before them a short analysis of its contents.

After a dedication to Sir Henry Halford in the author's favorite style, of which we shall say more hereafter, he proceeds in his *Essay introductory* to unfold his views with regard to the preciousness of blood in the animal economy, and to expatiate in strong terms on the sin and shame of shedding it in a reckless Sangradic manner.

There is too much truth in the following graphic picture of our author; but we have reason to complain that here, as elsewhere, he fails to point out any rules for distinguishing those states which, although resembling each other, demand very different modes of treatment.

"I wish to impress upon the student, that in medical, as well as in judicial conditions, the doubt should tell in favour of the pannel. So sacred is blood, do not spill it upon conjecture. What is the history of our art in the matter of traumatic apoplexies produced by fractured crania or depressed bone? Death! death! But never without previous bleedings! A poor fellow is brought into an hospital stupid, haggard, *demanding commiseration* through his mere wretchedness of look. He has received a blow on his skull. 'His brain is concussed.' Yes. But every other part is concussed. 'Do, pray, let him rest! Do not bleed him! Do not leech him!' But repose is not the order of the day; and, as something must be *done,* the patient is teazed with leeches, blisters, mercury: chatterboxes inquiring how

he feels; nurses asking him what he wants! Then comes reaction; attempts at victory by the vis medicatrix! But reaction is dreaded as much as the blow; and forthwith the lancet is employed to subdue *all* excitement, whether bodily or mental, whether heat of skin or garrulity of tongue. And it is used again and again until the patient expires. Then comes the post-mortem inspection; when it is found that the skull, somewhere or other, is split; that the membranes are yellow with lymph; serum effused; yet not over-much blood in the vessels. Then comes the consolation, that 'with such a state of parts no recovery was possible.' How do I know this? All I know is, that without blood no reparation of mischief can take place, that with free bloodletting meningitis *has* occurred. Surely such a sufferer could not have been worse if he had been let alone. Meddled with *thus*, can he have so fair a chance? Doubtless the brain is a most delicate organ; and lesions and inflammations must be combated with unusual activity. But the brain, like other structures, is under the regime of the vis medicatrix. It struggles long against mischief if you leave it power." (Introduction, p. xxv.)

We must not be carried too far, however, by the learned doctor's eloquent appeal. That in the first stage of injuries of the head, when the sensorium is oppressed and the vital energies sunk, it is highly improper to drain the vessels of blood we readily admit, and our best authorities in surgery are quite decided upon this point. But we never can admit it as a general rule of practice, that, *after reaction has taken place*, venesection ought not to be had recourse to, or that a patient so circumstanced has a better chance of recovery without loss of blood.

At pages 34, 35, and 36, he relates two cases of nervous irritability of the eyes, which, as they are happily illustrative of the pernicious effects of meddlesome surgery, and more especially of great depletion, we recommend to the attention of our younger readers.

The first Essay is on VERTIGO, of which the author distinguishes several varieties: e.g. *Vertigo optica* of Darwin, to which persons about fifty or sixty years of age are subject, when their sight begins to fail; *vertigo symptomatica*, arising from sympathy with the stomach in dyspepsia and nervous diseases; *vertigo nervosa*, an affection peculiar to hysterical women, and men who over-work the brain; *vertigo ebriorum*, experienced by drunkards, in whose case Dr. Hull maintains with Dr. Percy, that the influence of the drink is exerted directly on the brain; the *vertigo of sea-sickness*, best prevented, he says, by the horizontal posture and closed eyelids, and for which he recommends "strong spirit and water, and if this avail not, a powerful opiate." Few will question the correctness of the conclusion to which Dr. Hull arrives, "that vertigo is not always indicative of a determination to the brain;" and if he had turned his knowledge of Greek to cultivating an acquaintance with Galen and Aretæus, as well as with Euripides and Pindar, he would have learned that it is not true that "giddiness is almost always attributed to a fulness of the vessels of the brain." On the contrary, even these ancient authors were aware that it often arises from sympathy with distant parts, as the stomach, the liver, and the spleen; though notwithstanding what Dr. Hull has written *in favour* of vertigo, we must say that in too many cases we have found reason to agree with Aretæus, in looking upon it as a *serious complaint*.

The second Essay ON SLEEPINESS, contains some speculations on the *brain* and the *soul*, of so abstruse a nature, that we are almost afraid

to meddle with them. What Dr. Hull says respecting the brain may be quite true, but for ordinary capacities, we think he jumps rather abruptly to the conclusion "that we think and digest with the same organ; solve a problem of Euclid; and dissolve a mutton-chop." As in the former essay, we desiderate in this the practical rules for discriminating cases requiring opposite kinds of treatment. At pp. 25-6, he relates two cases of apoplectic sleepiness, in the treatment of which, with all due deference to so high an authority, we are much disposed to think that he was wrong in the former, and "the other surgeon" right in the latter. Instead of quoting these cases, however, we will here present our readers, from our own observation, with a case which we consider important as showing that the most alarming symptoms of *apoplectic stupor*, may be altogether nervous.

A man about sixty years old, of a nervous temperament and timid disposition, while lying in bed half-a-sleep, was roused by a scream proceeding from an adjoining apartment; he started up and spoke a few words incoherently, but almost immediately became insensible, and had to be laid down in bed, when he soon fell into a state of the most profound stupor, insomuch that when he was bled in the arm by a surgeon about twelve hours after the attack, he showed not the slightest symptoms of sensibility. In this state he lay for the space of nearly three days, when he began to amend, and in the course of a few days his health became completely restored.

The third Essay is on SOPOR HYSTERICUS. This must be admitted to be a very interesting subject of inquiry, but we do not find many new facts brought forward by our author in relation to it. We also think that his plan of treatment will scarcely be admissible in those circles of society to which his friend Sir Henry Halford devotes his services. For example, (p. 28,) to rouse a girl from a profound hysterical sleep, he directed "to heat the kitchen poker to candescence, and brought the heated iron to approximation with her soles; near enough for the radiation; not near enough to burn. In a few seconds she felt the pain; retracted her feet; roused herself suddenly on her breech; rubbed her eyes; looked surprised around the room, and was well!" Fortunately, however, it is not necessary in all cases even to approximate the heated iron to the skin, as it often happens that when the patient hears this Boerhaavean order given, the terror reduces her to quiet.

The fourth, fifth, sixth, and seventh Essays treat of HEADACH, of which Dr. Hull describes several varieties, but without leaving us with the impression that he has exhausted the subject. Of course he is quite warranted in drawing the conclusion that pain in the head does not necessarily imply fulness of it; but this, as we have already said, is no new opinion, but has been maintained by the best authorities in medicine from the earliest ages. At the same time it must be admitted, that although, as Dr. Hull says, "the history of apoplexy is not a tale of headach," headach is, unquestionably, a very common precursor of it, and a not unfrequent attendant on its invasion. In plethoric headach it is admitted that "cupping is a commendable remedy." We believe it is so, generally speaking; we have, however, seen more than one instance where the subjects so treated have complained of feeling that more blood had been *drawn to* the head, than *taken from it* by the operation. In inflammatory and congestive affections of the head, we are, on the whole,

disposed to prefer a revulsive bleeding from the arm. We have also seen much benefit from the application of a few leeches to the lining membrane of the nostrils. We believe that this mode of applying leeches is common in Italy, being in imitation of the old practice mentioned by Aretæus and Paulus Ægineta, that of scarifying the vessels of the nostrils. It has this additional advantage, that one leech thus applied will procure a greater discharge of blood than half a dozen applied to the external skin.

The eighth Essay is on Epileptic Convulsions, and the *ninth* on Apoplectic Convulsions. Though the former of these does not contain anything very original, we would beg to direct attention to the cases connected with *exostosis* of the cranium, and cured by the application of the trephine. That in epilepsy, bloodletting is generally very inefficacious, we do not require any new authority to convince us. In apoplectic convulsions the author admits that there is congestion in the brain; but suggests that "the cerebral infarction is venous;" and he maintains that even when it is well ascertained that there is congestion, it is not safe to apply the remedies usually relied upon, namely, purging and bleeding; as they have often the diametrically opposite effect from what they are intended to produce. From two cases which he relates, he draws the conclusion that "the purgative treatment, like bloodletting, may, when excessive, determine to the head," (p. 87;) and he says afterwards of bloodletting, "This case illustrates .... the principle laid down by Dr. Warren, that the more you bleed the more you determine," (p 93.) If these conclusions are valid, we shall be obliged to forswear the lancet altogether, that we may not have the blood of our fellow-creatures upon our heads! In the preceding essays, Dr. Hull has proved to demonstration, that if we abstract blood when there is *no* "determination to the head," we shall most assuredly kill our patient, and now he tells us that we shall do so with still greater certainty if there be "determination," since "the more you bleed the more you determine."

The tenth Essay is on Delirium and Photopsia. Delirium is a symptom of so many diseases and different conditions of the system, that we do not conceive Dr. Hull warranted in affirming that "Delirium is a symptom for which bloodletting is very perniciously and at random prescribed, or rather practised." (p. 94.) On the contrary, we believe that not only do professional men not rashly bleed in cases attended with delirium unless there be other symptoms to indicate it, but that even the common people look upon delirium as being often connected with "emptiness of the brain." Dr. Hull's remarks in this chapter we, therefore, look upon as being uncalled for. His cases of *Photopsia* possess little interest.

In the *eleventh Essay*, on Insanity, he sets out with questioning the soundness of the established opinion, "that the disorder is more bodily than metaphysic (*mental?*)" an opinion, however, which we see nothing in his facts or arguments calculated to controvert. As Dr. Hull does not pretend to affirm that the profession is too bloodthirsty in the treatment of lunatics, so in this essay he has almost entirely lost sight of "determination to the brain." The cases he has collected on this head do indeed possess a certain degree of interest, as indeed every collection of carefully related cases cannot fail to do; but they do not at all bear on the subject of this work.

The twelfth and last *Essay* is on a characteristic subject, DEATH; as if the author meant thereby to inculcate that this is the termination of "determination to the brain." His aim, however, in this essay is to establish the fact that the brain is the *ultimum moriens*, that it is well supplied with the vital fluid while all the other parts of the system are empty. Here he passes in review the dying scenes of some of the greatest worthies of ancient and modern times, Pericles, Hadrian, Epaminondas, Wolfe in Canada, Moore at Corunna, Nelson, "the Imperial Corsican," and last, (as if by way of contrast, we suppose,) a girl aged ten years, who dying of peritonitis, "occupied every interval, when not asleep, in singular and shrewd loquacity!!" Now all this may be very interesting to the collector of anecdotes; but we do not see that these stories throw much light on the nature and treatment of "determination to the brain."

Before concluding, we must say a few words of the *manner* or style of Dr. Hull's book. Here it will be readily acknowledged there is no want of originality. We do not remember to have ever looked into a medical volume which contained so many words and expressions which were altogether new to us, or at all events used in a strange signification. Take the following as examples: *pigmeian* (pygmæan?) p. x; *libellule*, ib.; *sanguifiction* (sanguifaction?) p. xiv; *practicality*, p. xvi; *scirrhopöetic*, p. xxviii; *laxation*, p. xxxvi; *saginate*, p. 5; *metamorphiotic*, p. 27; *detegible*, p. 37; *arthric* (arthritic?) p. 50; *salvatory*, p. 54; *diagnize*, p. 62; *hymenæous*, p. 68; *erotopoetic*, p. 69; *prepuberous*, p. 79; *feelable*, p. 90; *bibulous company*, p. 93; *empiricoid*, p. xliii; *hysteroid*, p. 120; *despotules*, p. 128; *strategic*, p. 152, &c. &c. At first sight nothing struck us so remarkably in the appearance of the work as the profusion of Greek and Latin verses which we saw scattered over its pages. We had the curiosity to count the number of quotations from Euripides alone, and found that they amount to twenty-eight; most of them, however, in order, we suppose, to increase the mystery of the thing, are set down anonymous. We were much delighted with the sight, imagining then that we had stumbled upon an ingenious critic, who had detected in the verses of the philosophical dramatist, certain recondite meanings and obscure allusions to medical subjects which had escaped the perspicacity of the Porsons and the Hermans. We fancied to ourselves that he must have succeeded in tracing the symptoms of "determination to the head," in those tremendous scenes of whirlwind passion which the poet delights in depicting. We conjectured that most probably Dr. Hull will make it appear that, when Orestes is represented as mistaking his sister for one of the furies, the poet was only describing the effects of "determination to the head;" and that when the mad Bacchanalian women of Thebes tore Pentheus limb from limb, they were all labouring under a similar affection. It turned out, however, upon looking more narrowly into the work, that Euripides was admitted to be quite innocent of making any allusion to "determinations;" and that it was very much in an out-of-the-way manner that his verses had been honoured with a place in the work before us. Thus, in relating the case of a poor gentleman who had hurt his health from sorrow for the death of his wife, two quotations from the *Alcestis* of Euripides, are introduced to the effect, "that it was little consolation to him that many others had been afflicted with the loss of a wife, and that his sorrow was still fresh." A quotation

from the *Ion* is dragged in to adorn an anecdote of Lord Nelson, who, it appears, when he first saw the combined fleets off Trafalgar, felt as keen an appetite for his dinner as he did for fighting! (p. 19.) The principle of teetotalism is clenched with a line from Pindar, (p. 41;) and the fall of "a commercial traveller," armed with a certain bed-room utensil little calculated, one would have thought, to flourish in heroic verse, is celebrated in one of the thundering lines of Homer! (p. 23.) Quotations from Virgil, Ovid, and Martial, also occur in the work, but more sparingly, the learned author probably considering that Latin as too common for learned use.

With all its faults and peculiarities, however, we must say that the small volume before us is smartly written, and is very amusing. We think also we can perceive, through all his pedantic display of learning, that the author is a very good-natured and pleasant man; and though we can have but little sympathy with his anti-reform horrors, and do not quite understand some of his best hits (probably local), we shall not be sorry to meet with him again.

ART. XIV.

1. *On the Anatomy and Diseases of the Urinary and Sexual Organs: containing the Anatomy of the Bladder and Urethra, and the Treatment of the Obstructions to which these passages are liable.* By G. J. GUTHRIE, F.R.S. &c. &c. Third Edition.—*London*, 1843. 8vo, pp. 156.

2. *Traité Pratique sur les Maladies des Organes Génito-urinaires.* Par le Docteur CIVIALE. Première Partie: *Maladies de l'Urètre.* Seconde Edition, considérablement augmentée.—*Paris*, 1842. 8vo, pp. 588.

Practical Treatise on the Diseases of the Genito-urinary Organs. By Dr. CIVIALE. Part First: *Diseases of the Urethra.* Second Edition. —*Paris*, 1842.

M. CIVIALE and Mr. Guthrie are men of great experience and great ingenuity; and anything coming from their pens is entitled to attentive consideration. But as Mr. Guthrie's work has reached a third, and M. Civiale's a second, edition, they would not under ordinary circumstances claim at our hands any lengthened notice. Nor is it our intention to give a general review of the volumes before us; but as we have reason to believe that a good deal of misapprehension exists on one important practical subject treated in them, we purpose devoting a portion of our pages to its consideration. What we refer to is the treatment of stricture.

Why is it that we have so many works on urethral diseases? It is not that they are more frequent than others; it is not that they are more difficult to treat than many; it is not that any superior plans of treatment are suggested;—for what has the last century done to improve their treatment? Is it, sometimes at least, to constitute a vehicle for advertisement? We hope not; and yet no books are so frequently paraded in the daily papers as those treating of this class of diseases. Whatever may be the reason, we could wish that respectable men would eschew this least-to-be-desired mode of acquiring popularity. We do not, however,

conceive that our continental brethren are at all less open to remark in this respect than ourselves. It is true their plan of puffing is a little different. With us it is a formal advertisement for the nonce, unblushingly paid for: with them, a man is apt to purchase an interest in one of the daily or weekly papers, and thus more insidiously, though not a whit more respectably, keeps his name and his deeds before the public.

Some idea of the scope of these works may be obtained from the fact, that Mr. Guthrie disposes, "1st, of the structure of the bladder, and, 2d, the urethra; 3d, the formation of spasmodic and permanent stricture; 4th, symptoms of and means of cure of stricture; 5th, of the treatment of impassable stricture; 6th, suppression and retention of urine; 7th, irritation of the membranous and prostatic parts of the urethra;" in 155 pages! In justice, however, to the author we should say, that he has divided the general subject into two parts, of which the present is the first; and he has done this because it is inconvenient to him to superintend the printing of a large book: and that the second part will contain "Chronic complaints of the prostate, the diseases of the bladder, the treatment of calculous affections, and the various modes of operating for the removal of a stone from the bladder."

We would respectfully suggest to Mr. Guthrie that his present title would induce us to expect more than we are likely to get. Surely the kidney is a urinary organ, and the testicle a sexual one; but nothing is said or promised of them. So is gonorrhea a disease of the urethra, but it finds no place in this work. M. Civiale takes a different course: he gives us a volume of about 600 pages on the diseases of the urethra, as much on the diseases of the prostate, and not less on those of the bladder.

Both Mr. Guthrie and M. Civiale occupy a considerable space with the anatomy of the parts concerned; of Mr. Guthrie's work more than one fourth is thus disposed of. Is this necessary? Does not every work on anatomy enter at sufficient length on the subject? Sir B. Brodie clearly thought so, for he does not devote a single page to the matter. But then it may be said, Mr. Guthrie discovered some muscular fibre which Wilson did not; and also that Mr. Wilson's ideas of the use of others were incorrect. He has also shown that the female has a prostate, which Wilson does not appear to have known; and therefore he has reasons for entering at length into the anatomy of the excretory urinary organs. And M. Civiale will no doubt say that it was important to show that the English did not know the direction of the urethra; and that, being ignorant of this point, their instruments were so formed as to facilitate the making of false passages. Mr. Guthrie in his 155 pages, and M. Civiale in his 600 pages, have confined themselves, in so far as concerns disease, almost entirely to stricture of the urethra.

First, let us see what a stricture is, and how it is produced. Both M. Civiale and Mr. Guthrie maintain that there may be a state of simple spasm of the urethra, unaccompanied by any structural change, and constituting what is known as *spasmodic* stricture. The former author allows that such a condition is most frequently developed in the membranous part of the urethra,—that portion of the canal on which the muscles of the perineum act; though it may occur in the spongy region of the urethra. For ourselves, though we would not absolutely deny the possibility of spasmodic stricture in *the absence of any irritation* or *struc-*

tural change at the part affected, yet we very much doubt even its occasional existence.

A *permanent* stricture, according to Mr. Guthrie, depends upon some positive alteration of structure of the wall of the canal, which causes it to thicken, and at the same time deprives it of its capability of being dilated with the same facility and to the same extent as in health. This alteration of structure is produced by inflammation, although it is difficult to account by it alone for the various appearances which these altered parts assume. A permanent stricture, according to M. Civiale, is a morbid condition of the urethral parietes, which has for effect to diminish progressively its extensibility, and at last to constitute a more or less considerable obstacle to the passage of urine. Such an obstacle may be occasioned by a kind of *bridle*, as pointed out by Sir C. Bell; by *excrescences*, by *adhesions*, and by *indurations*. No practical surgeon would deny the occasional existence of the bridle or valve-like stricture; and the evidence of Morgagni, Petit, Soemmering, Bell, Leroy, and Civiale is equally conclusive as to the possibility of the obstacle being caused by an *excrescence*; but if by *adhesion* be meant the two sides of the urethra entering into union,—we think we have no proof of such a circumstance. Undoubtedly the ordinary stricture of the urethra is caused by inflammatory action, usually of a chronic kind; set up at some point of the urethra, by which the parts become thickened and inelastic, and the passage is narrowed.

It has long been a settled point, that in probably forty-nine cases out of every fifty a stricture of the urethra is produced by a thickening of the submucous tissue; that thickening is the result of inflammation, and that inflammation is a consequence, in probably ninety-nine out of every hundred cases, of gonorrhea. And this we maintain, though M. Civiale states that a great many cases of stricture are caused by the introduction of instruments for the purpose of curing a stricture which was previously (but we conclude erroneously) supposed to exist. M. Civiale very naïvely suggests that those things are much commoner in England than in France; and further states, that the most eminent surgeons in England do not hesitate to place it in the first line among the causes of stricture. We do not refuse to admit that many men have been treated for stricture when no stricture existed, but it would be necessary to tax our credulity very largely to acknowledge that this was *a very common cause* of stricture. We have no doubt that when stricture already exists, it has often been made worse by improper treatment. But when M. Civiale states that *very distinguished* English surgeons have placed this in the first line of causes of this disease, he should have told us who they were.

Much labour has been expended in the attempt to fix the exact depth of strictures from the external orifice of the canal, but this seems to us an idle waste of time. It has been amply proved that the region of the curvature is the ordinary seat of the disease, but the distance of that region from the orifice must depend upon the development of the penis itself. M. Civiale felicitates himself on having discovered that the curators of the museums in London are all wrong in the statements appended to the preparations of stricture, and that what they describe as strictures of the membranous part of the urethra are nothing of the sort, and that they have mistaken the spongy for the membranous portion of

the canal. We seem to be sadly in arrear of our French brethren in our anatomical knowledge. He thinks, also, (p. 148,) that this peculiarity was a source of mistakes in the application of the proper method of treatment. We admit that M. Civiale is well qualified to decide upon such a point, but we are really so ignorant as not to know that a stricture at five inches requires a different plan of treatment to one situated a quarter of an inch further from the orifice.

Although the ordinary seat of stricture be that of the curvature, yet a contraction may occur at any point from the orifice of the urethra to the prostate.

M. Civiale thinks that the morbid structure constituting the obstruction varies with the region affected, and that the treatment should vary with the region. We have carefully examined a large number of specimens of stricture in the different regions of the canal, but we are not sensible of any other difference than is caused by the greater or less density, which is probably dependent upon its duration,—except in some cases in the neigbourhood of the orifice, where the obstruction is caused by the cicatrization of an ulcer.

Nothing is more simple, under ordinary circumstances, than to ascertain the existence of a stricture, provided the surgeon possess moderate dexterity. At the same time, a bungler is frequently deceived, and patients are subjected to treatment when no proper obstacle exists.

A stricture rarely exists long without being accompanied by a discharge,—it may not be constant, but it will return again and again,—and by a difficulty in passing the urine; it may be, also, by disturbance in the bladder or the kidney. No prudent surgeon, however, will pronounce a confident opinion upon the existence of a stricture until he has carefully examined the canal. When, by the introduction of a common bougie, the surgeon has ascertained that a stricture exists, but has failed to penetrate into it, Mr. Guthrie gives the following directions as to the proper mode of proceeding:

"It will be necessary to take an impression of the face of the stricture, in order to discover where the opening is situated. This is accomplished by means of a model bougie, the point of which is made of softer materials than the shaft. The point having been made sufficiently soft by heat, should be well oiled, and passed down to the stricture, against the face of which it is to be gently but steadily pressed. If the stricture, although narrow, is not very tough or permanent, it will sometimes yield, and the soft bougie will go through, when the point of a harder one only bends, twists, or turns back, the bougie having doubled on itself in the passage. If the stricture should not yield, the point of the model bougie does, and is gradually pressed into the sinuosities or openings on its surface, so that after remaining some two or three minutes, it may be withdrawn with one or more processes or marks projecting from the end of it, either acute or obtuse, as the case may be, and indicating the commencement of the true, and sometimes also that of one or more false passages." (p. 72.)

Now we will venture to say that no more fallacious guide could be called in to our assistance in such cases than the model bougie,—and we may as well quote M. Civiale in confirmation of our opinion.

"As a means of diagnosis," says he, "the *sonde exploratrice* has been frequently substituted for the common bougie. As the advantages of this instrument have been much exaggerated, it is important to ascertain its true value. The *sonde exploratrice* does not always produce the happy effects which have been at-

tributed to it, and very frequently it is a faithless guide. At the same time that it will sometimes give us an useful indication, we must not lose sight of the fact that it will frequently deceive us, especially when the part to be modelled is at the curvature, and that is the usual seat of stricture. There, instead of penetrating into the contracted point, it is pressed almost into a globe, which, in its withdrawal, is apt to irritate the remainder of the canal. We have even seen cases in which a simple spasmodic contraction was sufficient to prevent it from penetrating, so as to give the idea of organic stricture, when a sound of large size would pass easily. And even when, under favorable circumstances, the soft bougie penetrates into the contraction, so as to make known the size, and, it may be, the position of the opening, experience shows that the evidence cannot always be relied on. If there be any spasm, the bougie indicates a smaller opening than the actual one. This is shown, by comparing the size of the model with that of a bougie which can be passed immediately after. And, whatever may be said to the contrary, the model rarely gives an exact indication of the position of the orifice, because all points of the circumference of the stricture do not offer an equal resistance." (pp. 173-5.)

This uncertainty has been proved by daily observation, and we can only wonder that a man of Mr. Guthrie's experience should advocate the use of an instrument so faithless in most cases, and the use of which is not unattended with pain.

As to the important question, how should stricture be treated? we find little—shall we say nothing?—that is new in either of the works before us. In the employment of dilatation both concur; and as to the result of dilatation there is little difference of opinion. Mr. Guthrie says, "a stricture cannot be cured by dilatation until such time as a passage has been obtained through it sufficient to admit a small bougie." The instrument must be gradually increased, until one "as large as the orifice will admit will at last proceed through the whole passage without meeting with any obstacle; and it ought to be repeated at longer intervals until the disposition for contraction seems to be removed, when the cure will often be complete." (p. 71.) M. Civiale says:

"In a word, the treatment by soft bougies in ordinary cases is reduced to the daily introduction of bougies whose volume increases from one to three and a haf lines in diameter, and which are so graduated as to cause a regular methodical and progressive dilatation. They are allowed to remain in the canal from two or three minutes to half an hour. The result of this treatment is a progressive diminution of the morbid symptoms, the gradual restoration of the general health, and a complete cure at the end of one or two months." (p. 222.)

Our own experience does not exactly accord with that above stated. We do not recollect in our own practice that the dilatation treatment is so successful. In most cases we can dilate the canal, and often without experiencing difficulty; but the tendency to relapse is not so easily got rid of, and the necessity for persevering in the occasional use of the bougie, for the remainder of life, has been the common fate of those who have come into our hands with well-developed stricture. It is not indifferent in the treatment of stricture by dilatation, whether the instrument be allowed to remain in the canal one or several minutes or one or several hours; to the one plan the term *temporary*, to the other the term *permanent*, has been applied. The former is the older and more commonly followed plan; the latter is practised by but few. But of these plans there are various modifications. Some persons pass first a bougie which is easily admitted into the stricture; that is immediately withdrawn and

a larger one substituted; or each may be allowed to remain one, two, or three hours, or even days, in the canal.

No surgeon is ignorant of the fact that it is possible to dilate the urethra with great rapidity. There is no doubt that when once a passage is obtained for a small bougie, by perseverance one of large size may be passed within thirty-six hours; but it cannot be done without much pain and some danger, and the cure can rarely be thus accomplished. A slower and more rational plan will succeed better, and the patient will be spared much suffering. The treatment by bougies will sometimes excite a good deal of irritation in the canal; it will sometimes cause disorder in the testicles, will sometimes cause false passages, will often fail, that is true; and we are bound to reiterate that, in our experience, unless a stricture be very recent, the treatment by dilatation is only palliative.

The other side of the case is this: that, prudently employed, the pain attendent upon the treatment by *temporary* dilatation is not great, provided it be done gradually and delicately; and there is no doubt that, occasionally, the proper elasticity of the canal is restored and the cure is completed. But when *permanent* dilatation is resorted to, the circumstances are different. The continued presence of a dilating body in the urethra is not usually easily borne; it generally determines heat and pain, which in many cases soon becomes intolerable, and fever is excited; in all cases it irritates the mucous membrane, and determines a more or less considerable discharge; it may cause inflammation of the testicle or the development of abscess. In many cases, when this plan is followed out, the more severe symptoms after a time subside. When this is the effect, the good done at the contracted point soon becomes evident; larger instruments can be passed with scarcely any pain, and the complete dilatation of the canal is then very quickly accomplished; the urine passes freely, and the urethral discharge ceases. Then it is that the patient conceives himself to be cured, and too often his impression is strengthened by his medical attendant; and no further attention to his case is deemed necessary until the stream diminishes and dysury is again present. The fact is, if the dilatation be very quickly effected, the reaction also will quickly follow; for, instead of inducing absorption, as is sometimes the case when the temporary plan is followed, it acts like a wedge. Over and above this—the fact that the *permanent* plan of dilatation is frequently intolerable to the patient and especially uncertain in its results—it condemns the patient to the bed or the sofa, and exposes him to many accidents.

Cauterization, as a means of destroying the morbid structure upon which the contraction depends, has been many times exhumed from the oblivion to which it has been again and again consigned. Every new exhumation is made to test the virtues of a new caustic or a new instrument, the principle experiencing no change. The use of the orpiment, the verdigris, and the red precipitate, no one, except Civiale, seeks to revive; nor do many desire to perpetuate the mode of applying them. They were usually incorporated with the extremity of a common bougie. Loyseau, Paré, Wiseman, and John Hunter thought the caustic should be introduced in and protected by a canula; but ultimately their plan was found unsatisfactory, and Hunter caused the nitrate of silver to be inserted into the point of the bougie: such was also the plan of

Home. In all these methods the same principles were sought to be carried out—the destruction of the morbid structure, and the application of the caustic upon its anterior surface. To both those principles there are, we conceive, strong objections. There can be no security against the application of the caustic upon the healthy membrane; and to this it was that the many accidents of cauterization, such as hemorrhage and retention, were owing. The placing of the caustic a little on one side, the reducing it into a paste with mucilage, the previous introduction of a large bougie, or fixing the caustic in the centre of the point of such a bougie, or even the substitution of caustic potash for lunar caustic, do not seem to us to relieve the plan from those inconveniences. Then, supposing the plan to be freed from all these sources of mischief, is it a thing to be desired? We say decidedly, no. If the principle be carried out, the patient's condition would be rendered worse rather than better; and for this reason: it has been abundantly shown that the mucous surface is comparatively unchanged in ordinary cases of stricture; the morbid product is beneath it: now, if we destroy that product with caustic, we must infallibly destroy the mucous membrane before we can get at it, and as certainly the destruction would be followed by an unyielding inelastic cicatrix. The condition of the patient must, in this way, be made worse than before; because no dilating instrument could exercise any efficient influence upon such a structure in making it elastic.

It will be asked, was that the common experience when cauterization was so generally practised? In many instances it was, no doubt. In many more it was not. The reason of this was clearly shown in a former Number of this Review, (July, 1842,) when considering the admirable work of Sir B. Brodie on the 'Diseases of the Urinary Organs.' It is there stated that one of two objects is to be attained by the application of nitrate of silver upon the mucous membrane of the urethra; either a modification of an exaggerated sensibility, or a destruction of substance. With respect to the attainment of the first object it is no longer a matter of doubt. With regard to the second, some observations are necessary. The induration is rarely, if ever, confined to the mucous membrane which, in many cases, appears to have undergone little or no change; it is found to be very much confined to the submucous tissue. Now, if the nitrate be employed for the purpose of effecting the destruction of the indurated mass, it must be evident that before this can be accomplished, there must have been complete destruction of the entire thickness of the mucous coat, there must have been destruction of the submucous hardened tissue, and there must be a subsequent contraction of the surface in the work of cicatrization; in fact, there will be a new contraction, which may require for the remainder of life the daily use of a bougie to overcome. We apprehend, therefore, that the plan of treating stricture by destruction through the agency of nitrate of silver must be abandoned. Although this is the principle upon which that plan of treatment is supposed to be founded, we doubt whether it has often been carried out. We think that the mode in which it has been attempted to carry it out can only very rarely have accomplished the desired object, and for these reasons: the mucous membrane of the urethra is as thick as that which lines the cheeks; now, if a piece of lunar caustic be kept in contact with the latter membrane for a minute, a slough will be formed; in a few hours it will be

thrown off, and if in a couple of days afterwards the part be examined, no change of texture will be detected, and many applications upon the same point at short intervals will be required to produce any considerable change of structure. Although, then, we do not deny that the complete destruction of the mucous membrane may be accomplished by the repeated application of lunar caustic, we believe it to be, happily, a rare occurrence.

The experience of this mode of treating stricture was unfavorable, and plans for avoiding some of the objections, and obtaining a greater amount of good were propounded. The first was to take a cast or model of the part, so as to be able to apply the remedy only on the diseased point, and if possible to get it fairly within the stricture. At this Arnott and Ducamp laboured with some success. Mr. Guthrie it appears, like many other surgeons, was also dissatisfied with the effects of caustic applied to the anterior surface of a thick and narrow stricture:

"I was more than *twenty years ago* induced to try the effect of its application to the internal surface, by introducing it into the stricture. The method I adopted was to introduce a hollow silver tube into the stricture with a single eye, which was placed in a narrowed part of the instrument half an inch from its extremity, so that the sort of bulb thus formed on being passed through the stricture, might by catching or drawing it back bring the hole or slit in the narrowed part or neck of it, just opposite the internal surface of the stricture. Into the tube a platina wire was passed, carrying at a proper distance from its extremity a piece of caustic moulded with a hole in its centre for the wire and duly secured, and it looked as if it would act well, but it did not do much. . . . . . In 1825, M. Ducamp, of Paris, dissatisfied with his dilating instrument, . . . published a method by which the argentum nitratum was to be applied to the inside of a stricture also. . . . . . M. Lallemand, not satisfied with the certainty of the application of the caustic by this method, proposed another, which was to introduce into the stricture a hollow elastic bougie having a hole on one side near the end, into which he could pass another which fitted exactly, having affixed in it opposite to the hole existing in the first or hollow instrument a piece of caustic, which might in this manner be safely applied to the inside of the part affected. This method of proceeding I had invented and tried long before M. Lallemand wrote or had practised it. The instruments I had made were shown at my lectures five and twenty years ago; they are still in my possession, but they did not answer my expectations." (pp. 80-2.)

Mr. Guthrie contests the priority as to the mode of applying caustic to the interior of strictures which has so long been accorded to M. Ducamp. At page 80, Mr. Guthrie says it is more than twenty years ago that he was induced to try the effect of the application to the internal surface. This is an indefinite mode of marking time; if we are to take it at twenty years, that will carry us back to 1823, and Ducamp's work was published early in 1822, and not, as Mr. Guthrie states, in 1825. But at page 82, Mr. Guthrie states that he had invented the instrument *twenty-five years ago*, which would carry us back to 1818, three years at least before the publication of Ducamp's work. Let us see whether there be any earlier record of Mr. Guthrie's invention than 1822, because if there be not, with all his merits, the world will be apt to withhold this laurel from his wreath. The earliest record we can find of his invention is the first edition of the work before us, published in 1836. We do not mean to say that this is the earliest recorded intimation of it, but we know no earlier. So far then it is certain that the world will accord to that poor young man who was carried to an early grave, whatever little merit may attach to the invention, and Mr. Guthrie should not grudge it him.

Then, again, Mr. Guthrie had anticipated by many years M. Lallemand, who had improved on Ducamp's instrument. Mr. Guthrie says, and truly, that Lallemand was not satisfied with Ducamp's instrument, and that he proposed another, but where he finds that his improved plan was "to introduce into the stricture a hollow elastic bougie having a hole on one side near the end, into which he could pass another which fitted exactly, having affixed in it, opposite to the hole existing in the first or hollow instrument, a piece of caustic," we cannot tell. It is quite true that Lallemand was dissatisfied with the instrument which Ducamp invented to carry out his plan of applying the caustic to the interior of the stricture, but it is incorrect to say that he used any such instrument as Mr. Guthrie describes for the purpose. In 1825 he published the first part of his 'Observations sur les Maladies des Organes Génito-urinaires,' in which he expresses his opinion in favour of his own modification of Ducamp's instrument. But his instrument, instead of being what Mr. Guthrie describes, is "straight or curved; composed, 1st, of a platina tube open at both ends, destined to protect the nitrate of silver; 2d, of a central part of the same metal, having near its extremity a gutter for the caustic; it should terminate with an olive-shaped enlargement, by which the extremity of the sound should be blocked up; when used the central part is projected several lines beyond the tube." We do not see that this instrument bears any very close resemblance to that which Mr. Guthrie has referred to M. Lallemand. Without stopping longer to point at these trifles in the work before us, we deem it important to offer some observations on cauterization in general.

At present, two opinions prevail with respect to this remedy; one, that the only good which can be obtained from the use of caustic is to modify the sensibility of the part; another, that the obstruction must undergo chemical destruction. The partisans of the former method seek to change the nature of the morbid action, and so facilitate the treatment by bougies; the others conceive that if they can destroy the morbid structure, dilatation will be useless or something worse.

We believe, as we have already stated, that the effects usually anticipated from the use of caustic really do not take place, although many persons appear to consider it as to be placed beyond a doubt they do. There can be no doubt that in some days after the application of lunar caustic upon a stricture the stream of urine will be sensibly enlarged, and this has been regarded as a proof that the canal is enlarged. It is possible that such a result may sometimes be attained; but under such circumstances we have more than once resorted to the following experiment to satisfy ourselves, that when the stream of urine is really enlarged the canal is also enlarged. Before the caustic has been applied, the largest bougie has been passed which the stricture would admit. Eight or nine days have elapsed, and beyond all doubt the stream was sensibly enlarged, but no larger-sized bougie could be passed. We have therefore concluded that in many cases, perhaps in most of those where a decided amelioration has followed the use of caustic, it is owing, not to the destruction of any portion of the morbid structure, but to a modification of the sensibility of the mucous surface at the point. At the same time we believe that this mode of blunting the sensibility at the point, may also facilitate in many cases the passage of a larger instrument than was previously admitted.

There is a singular inconsistency in the reasoning of M. Civiale, in his estimate of the effects of nitrate of silver applied upon the mucous membrane of the urethra. He says (p. 290,) it has generally been admitted, but without reflection, that nitrate of silver acts simply as an escharotic. If it were so, and if each application destroyed, as is said, a portion of the membrane,—its whole thickness should be destroyed when, as is frequently the case, it is applied many times. This is, however, not the case; for when we have an opportunity of examining such a case after death, no traces of the application can be found. At page 295 he says, whenever it is repeatedly and unguardedly applied it occasions serious disorder, such as false passages, &c. Now it seems to us that if it makes false passages it must very completely destroy the whole thickness of the mucous membrane. On the whole, then, every one will be struck by the gloomy pictures painted by the opponents of each. To a certain extent Ducamp also did so, but still he always regarded dilatation as the ultimate means of cure: his followers have lost sight of that, and advocate the destruction of every morsel of morbid product, and hold dilatation to be an unnecessary and painful expedient. The opponents of cauterization point to cases where persons who have been cauterized have had for the remainder of their lives much difficulty in making water; where inequalities, corresponding to cicatrices, have been produced by it; and where obstinate discharges, complaints of the testicle, and other complications have been the result.

That the methodical treatment by bougies is the surest plan of treatment in ordinary cases, there can, we think, be no reasonable doubt; that it is the necessary complement to the treatment by caustic is equally clear; and it was in accordance with this conviction that Ducamp introduced certain modifications in the form of dilating bodies. He conceived that it was desirable to procure the greatest possible amount of dilatation; that is to say, he wished to make the narrowed portion as wide as it was before it became diseased. As the orifice is the narrowest part of the canal, a cylindrical instrument large enough to effect the complete dilatation cannot be passed without much difficulty and pain. Supposing it be deemed proper to introduce such an instrument, either an incision must be made so as to enlarge the orifice, or a bougie, bellied or enlarged at one point, is the only plan by which it can be accomplished. It is found that the orifice may give way for a moment so as to allow the enlarged point to pass without much inconvenience. To the use of the *bellied* bougie, or *bougie à ventre*, Ducamp was accustomed to attach much importance. Mr. Guthrie also thinks the principle an important one. In some cases he "attempts to dilate the diseased part without dilating the whole; without dividing the orifice, to obtain admission for a larger instrument." He says, (p. 74,) "My first attempt in this way was by having a bulb made about an inch from the end of the instrument, which was small at its point and gradually increased to the size desired, from which part it again diminished to a proper-sized shaft;" but as this did not succeed to his wishes he got Mr. Weiss to make a sort of speculum for the purpose. Again: "The opportunity for dilating was in general too tempting to be resisted, and the consequence was that it produced irritation in so many cases that I was forced to give it up." He got a dilator made of softer materials, which was proposed by Dr. Arnott, but

which also failed; and he only mentions those circumstances and some improvements he suggested to Dr. Arnott for the purpose of showing the attention he had paid to the improvement of this part of surgery, and that M. Ducamp had no right to lay claim to an invention which Mr. Guthrie states was long known and used in England.

In science the priority is usually conferred on the man who first records an invention, unless good cause to the contrary can be shown. Now, Mr. Guthrie may have used a bellied bougie in 1821, but M. Ducamp first recorded such an invention, not in 1825, as Mr. Guthrie states, but in 1822. And no later in that year than the 6th of May, Deschamps and Percy reported upon it to the Institute. We think, however, that neither M. Ducamp nor Mr. Guthrie need have taken much credit for the invention, for a more utterly worthless instrument for the majority of cases we could scarcely conceive: we are surprised that a surgeon of Mr. Guthrie's experience should have bestowed a moment's attention upon it. M. Civiale, who has had ample opportunities of estimating the value of these instruments, speaks but slightingly of them:

"The bellied bougies which have been proposed to remedy the inconveniences of the cylindrical instrument, are not so useful as has been supposed. Although we may, in certain cases, have recourse to them, they are far from producing the good effects which have been attributed to them. Spite of the eulogiums of Ducamp, who was not always able to avoid exaggeration, nor to preserve impartiality in the parallel between his own plans and those which experience had consecrated, the bellied bougie is in the present day abandoned. The extraordinary dilatation which is sought to be obtained by them is judged to be useless by all practitioners." (p. 208.)

With reference to forced injection, scarification, puncture, incision, and excision, as means of curing stricture, we shall only remark—that the alleged success of the first plan rests on a fallacy, the idea that in cases of stricture the retention of urine is caused by a blocking up of the contracted part by thickened mucus, which can thus be washed away; that the second and third methods, though practised for centuries, should not, we conceive, be used when the contracted point is too small to admit an instrument; and when an instrument can be passed, the puncture or incision is surely not often necessary.

Whatever be the means employed in the treatment of stricture, it is quite certain that the cure is not frequent. Those who rely upon caustic allege that the sound does nothing more than flatten the morbid product; the partisans of dilatation maintain that caustic is followed by an unyielding cicatrix. The true principle of cure we conceive to be this,—to effect the dilatation of the canal with the smallest possible irritation. This principle cannot be carried out by *permanent* dilatation,—the irritation is too great, and the reproduction of the contraction is often rapid; it can rarely follow the repeated use of caustic, which leaves in the end a thicker tissue than it found. We believe that the principle is best carried out by prudent dilatation; the chances of absorption and the regeneration of the primitive elasticity of the canal is then great; but even this treatment may be carried out too energetically,—much irritation may be induced, and the induration increased: and there are cases where the irritability of the surface is so great, that dilatation can only be employed when that irritability has been modified by the application of the nitrate of silver.

ART. XV.

1. *Some Account of the Epidemic of Scarlatina which prevailed in Dublin from* 1834 *to* 1842 *inclusive, with Observations.* By HENRY KENNEDY, A.B. M.B. T.C.D. &c., one of the Medical Officers of St. Thomas's Dispensary.—*Dublin*, 1843. 8vo, pp. 214.
2. *Scarlatina, and its Treatment on Homœopathic Principles.* By JOS. BELLUOMINI, M.D.—*London*, 1843. 8vo, pp. 32.
3. *Untersuchungen und Erfahrungen über das Kohlensaure Ammonium und seine Heilkräfte gegen das Scharlachfieber, &c.* Von A. W. BODENIUS.—*Heidelberg*, 1842. 8vo, pp. 170.

Experimental Researches into the powers of the Carbonate of Ammonia as a Therapeutical Agent in the Treatment of Scarlatina. By Dr. A. W. BODENIUS.

FEW tasks are more interesting than that of tracing the various changes which diseases have undergone in the course of time. Some maladies, once the scourges of our race, have ceased to exist, or have assumed so mild a form as no longer to excite alarm; while others, which in bygone days were comparatively trivial, are now dreaded as dangerous or fatal. This fact did not escape the notice of the earlier medical writers. "Mutantur quidem morbi," says Van Helmont, "larvantur, augentur, degenerant. Nec veteres morbi respondent amplius descriptionibus avorum. Postremo nuper ad nos venerunt morbi novi, et antiqui deinceps vix amplius respondent ad nomina et descriptiones avorum, quia signa et proprietates alienas induerunt, quibus larvati incedunt." No disease has afforded more striking illustrations of such mutations than scarlatina has done, since the time when it first ravaged Spain and Italy under the name of the *Garrotillo.* On these, however, we cannot now dwell. Our present purpose only allows us to observe, that about the commencement of the present century, scarlet fever assumed an unwonted malignancy, and spread epidemically, especially in Germany, where its ravages were frightfully severe. Thus, in the neighbourhood of Wittenberg,* four hundred persons were attacked in the course of fourteen days, and one in ten died. In London, too, the disease ran a rapidly fatal course, and was distinguished by the severity of the sore throat by which it was attended. It prevailed also in Ireland as an epidemic disease from the year 1801 to 1804, running a fatal course in many instances, and presenting much of the character of scarlatina maligna. It then changed its character, and continued for many years so mild, that Dr. Graves informs us in his lectures, "although scarlatina epidemics recurred very frequently during the next twenty-seven years, yet it was always in the simple or mild form, so that I have known an instance where not a single death occurred among eighty boys attacked in a public institution." With that self-complacency, so natural to mankind, this diminished mortality was attributed to the altered plan of treatment, to the doctrines of Brown having been discarded, and antiphlogistic means resorted to in place of the stimulating and exciting method which he advocated. In 1834, however, the disease resumed the grave featnres it seemed to have altogether lost, and Dr. Graves states that the Irish physicians of the present day are

* Schnurrer, Chronik der Seuchen, ii Band, s. 437.

forced to confess that in spite of their boasted improvements they have not been more successful in 1834-5 than their predecessors were in 1801-2.

It appears from the account given by Dr. Graves, that scarlatina in Dublin was seldom attended with danger until the year 1831, when a remarkable alteration began to be observed in its character; its previous inflammatory type was replaced by a concealed insidious form of fever, attended with great debility. It now, too, often terminated fatally, and began to extend much more rapidly and universally than before. Neither the state of the weather, nor the abode of the patient, seemed to have any influence in modifying its character or diminishing its prevalence. It is to a description of this epidemic that Dr. Kennedy's little work is devoted. Unfortunately, he furnishes us with no account of its rise, progress, and decline, or of the various fluctuations in character which it displayed at different times, or of how it seemed to be modified by the prevalence of other diseases, though such points should always be related by the historian of an epidemic. He does not attempt any classification of the various forms which the disease assumed; if we except a division he makes when describing the post-mortem appearances into the simply malignant, and the complicated; the latter comprising those cases in which there was very serious affection of the throat. Neither does he give any description of the disease as a whole, but treats of each symptom separately, and then details a number of cases which occupy sixty pages, and from these *membra disjecta*, the reader is left to form a picture of the disease as he best may. The faults of the book, too, are not confined to defects in arrangement, but the style is obscure and awkward in the extreme. It is, we think, no unreasonable requirement to expect that a gentleman who writes A.B. after his name should be able to express himself in English, but Dr. Kennedy breaks the rules of syntax in nearly every page, and we have often been able to gather the meaning of a sentence only by carefully comparing it with the context.

We will now endeavour to furnish our readers with a sketch of the main features of the disease as we can collect them from Dr. Kennedy's account, which, in spite of all its defects, is evidently the work of an honest, diligent, and truthful observer. In the simply malignant form, the eruption usually faded much after death; but in some cases in which it had not appeared until late in the disease, it went on rapidly increasing until death, "and continued to do so for a considerable time after, till at last the body in many parts became black, and taken as a whole was of a very dark colour. In these cases great swelling took place after death, and the signs of decomposition set in very early." (p. 3.) Vibices and petechiæ were present it many instances, and a lividity of the extremities as great as in patients who have died of cholera. In many of those parts too, where the body had been exposed to pressure, the integuments were found in a state of slough, which, however, seldom extended for any great distance. The cerebral substance was usually injected, and the ventricles contained fluid. Sometimes, too, there was an appearance of extravasation of blood beneath the arachnoid, such as is occasionally met with in typhus fever. Usually the appearances found in the brain after death, were in exact proportion to the severity of the cerebral symptoms during the lifetime of the patient. The lungs were found highly congested, and often broke down very easily; the bronchi were loaded with frothy serum,

and their mucous membrane was much congested. The heart was loaded with black blood, petechiæ were sometimes present on its surface, and its texture was occasionally softened. The blood was usually thin and watery. Congestion in patches, of the different abdominal viscera, was all that was found even in cases where during life the abdominal symptoms had been most striking.

The second, or complicated malignant form of the disease, was characterized by the severity of the affection of the throat, which sometimes came on when the fever was at its height, but quite as often after convalescence had begun. It generally proceeded very rapidly, and usually affected both sides of the neck, rendering the integuments extremely hard, sometimes reaching down to the pectoral muscle, and attended with great swelling, which subsided very rapidly after death. Serum or pus was found infiltrated into the cellular tissue; sometimes the pus was collected into one large abscess, or formed a number of little ones. In all these cases there was a great tendency to sloughing; and when that took place the lymphatic glands sometimes suppurated, and even the upper part of the sterno-mastoid muscle became disorganized. In three instances of this kind the patients bled to death, owing to the vessels of the neck giving way, and in two of these cases the jugular vein was ascertained to have been the source of the hemorrhage. There was another form of swelling about the neck, caused by the effusion of lymph only, which attained a large size very rapidly, was attended with no discoloration of the skin, but with extreme hardness of the integuments, and showed no disposition to suppurate. It does not appear that sloughing of the mucous membrane of the throat was the cause of death in any instance, but diphtheritis seems not to have been an unusual complication, and œdema of the glottis proved fatal in some instances.

"Both of these forms of disease were found accompanied by ulcerations varying in extent and number,—thus there was very constantly one in the upper part of either tonsil; its edges were irregular, and its depth usually very considerable. I also found ulcers in a very distinct form about the chordæ vocales; here, also, they were deep, but of a more circular form, and about the size of a grain of large shot; in one instance the alæ of the thyroid cartilage had become diseased." (p. 18.)

These ulcerations of the mucous membrane of the larynx seem somewhat analogous to those described by Dr. West as occurring in the course of measles.

Among the sequelæ of the disease Dr. Kennedy notices some forms of wry-neck, which he believes take their origin from the affection of the throat and neck we have just described. He distinguishes three varieties of it, and speaks first of

"...... cases in which, when the patient was to a certain degree convalescent, it was found that the child's neck had become crooked, and that when any attempt was made to bring the head straight, it caused severe pain, referred to the upper part of the neck, and commonly to one side. The pathology of this form of wry-neck is yet to be made out. Mr. O'Ferrall suggests that the inflammation of the throat spreads to the neighbouring textures, so as to engage those of the spine, and sometimes in this way causes caries. That this might occur is highly probable, but it must not be forgotten that apparently well-marked disease of this part of the spine may be with, or without any serious lesion, and in proof of it I would refer to what Dupuytren has published on the subject. There are, however, two other affections, of the nature of which I have been able to satisfy myself, both of which

cause deformity, and which it is very necessary to distinguish from what has been spoken of above, as they require a different form of treatment. The first has been alluded to before, when speaking of those swellings of the neck where nothing but lymph was effused; when, however, it causes wry-neck, its situation is then in the small muscles at the nape of the neck, and sometimes in the upper portion of the trapezius; some pain attends it when pressure is made, and it is a very obstinate affection to remove. I have seen the same form of disease after delivery, of which there was a well-marked example not long since, in Sir Patrick Dun's hospital, under the care of Dr. John Ferguson The pathology of this form of wry-neck consists, as already stated, in the effusion of lymph, and the matting together of all the parts about the nucha. The third form is quite different from either of the preceding; it is a much more common affection; that is, it is met with after other affections besides scarlatina. Thus I have seen it after infantile remittent fever, measles, and also one case of burn where the neck itself was not injured. It is this form of disease which many have seen in connexion with certain cases of hysteria. It arises from a spastic state of the muscles of one side of the neck, more particularly engaging the sterno-mastoid, and seems to be caused by the patient lying in one position in bed for a considerable period. The last case I saw of it laboured under the anasarca of scarlatina at the same time. It also is a very obstinate affection." (pp. 19-20.)

Inflammation and suppuration of the internal ear, purulent effusion into some of the joints, or the formation of abscesses in the soft parts of the extremities, were other sequelæ of the disease. Pneumonia, too, was by no means unusual, and was but seldom associated with pleurisy; which statement, if quite correct, constitutes an exception to what is usually the case. The kidneys were generally quite healthy, and this even in cases where the presence of albumen in the urine during the lifetime of the patient might have led to the expectation that they would be found diseased. Sometimes, however, the kidneys were greatly congested, and thrice they presented the appearances characteristic of Bright's disease.

In the second chapter Dr. Kennedy describes the symptoms of the disease, which varied so much in different cases that he considered it would be impossible to arrange them under the usual heads of scarlatina simplex, anginosa, or maligna. He states, that many cases which began with the most alarming symptoms, ran a very mild course; while in other instances the opposite of this was observed. In default of any attempt at classification by Dr. Kennedy, we are glad to be able to borrow from Dr. Graves's account of the epidemic, who states that the severer cases assumed one of three forms. In those cases which he refers to the first form, besides fever, sore throat, and headach, there were violent congestion of the brain and determination of blood to the head, giving rise at a very early period to convulsions and apoplectic coma. The second form was marked, in addition to the ordinary symptoms of the disease, by a severe headach, which existed from its very commencement; by pain in the back, and very great irritability of the stomach and bowels. This irritable state of the abdominal viscera depended on cerebral congestion, and resembled that form which accompanies and sometimes masks the progress of acute hydrocephalus. Dr. Graves found this variety of scarlatina extremely dangerous and very little under the power of remedial agents. Some cases, too, put on the third form, and ran a very insidious course, closely resembling that observed in many instances by Dr. Withering in the epidemic which came under his notice. The patients advanced favorably, with comparatively mild symptoms, till the eighth or

ninth day; when an exacerbation of fever occurred, with the return of sore throat, which speedily rendered deglutition difficult or almost impossible. Great swelling of the parotid and submaxillary glands now came on, and often surrounded the neck as with a collar; while a diphtheritic formation occurred in the mouth and extended into the pharynx. Fever, of a typhoid character, attended the local symptoms; and death took place after being preceded, for the most part, by some hours of distressing restlessness.

But to return to the description of the different symptoms by Dr. Kennedy. It appears that, in the greater number of cases, the attack of the disease was very sudden; sickness, vomiting, and dizziness occurring quite instantaneously in persons apparently in perfect health; or occasionally sore throat would come on just as suddenly. After these symptoms, which were generally attended with more or less marked pyrexia, had lasted for a few hours, a general condition of collapse, with great depression and phenomena like those of the cold stage of severe remittents came on, and lasted for from two to five hours, when reaction took place, and all the more prominent symptoms of the fever supervened. Among these symptoms were sore throat, which, in a more or less severe form, was never wanting; though by no means always attended with pain. In some cases, indeed, a very serious degree of sore throat was found to exist without the patient having made any complaint about it. In addition, too, to the more common form of sore throat, a variety was sometimes met with characterized by an aphthous condition of the mucous membrane; or, in other instances, the uvula was so infiltrated with serum as to acquire an enormous size. In those cases in which a false membrane existed on the tonsils, velum, or back of the throat, death took place more speedily than under other circumstances. Sloughy ulcerations of the tonsils were of very frequent occurrence, and were often attended with hemorrhage from the mouth, though never to such an extent as to prove fatal. Such ulcers often continued unhealed for many months after the subsidence of the other symptoms; a circumstance to which Dr. Kennedy attributes the long persistence, in many instances, of the contagious properties of scarlatina.

The date of the appearance of the eruption varied very much. In the great majority of cases, indeed, it showed itself within the first twenty-four hours; but sometimes an interval of two or three days elapsed between the occurrence of the first symptoms and the appearance of the eruption. It remained out from three to five days, and assumed a much darker colour before its disappearance than it presented at its outbreak. It was succeeded by desquamation; between the extent of which, however, and the extent and intensity of the eruption, there did not seem to be any connexion. The character of the eruption varied greatly; sometimes it was intermixed with an eruption of a miliary character; but the presence of that did not betoken anything serious. It was to be regarded as an occurrence of much graver import when a second crop of eruption appeared twenty-four hours after the first. It usually showed a greater intensity than the first eruption, but receded after having remained out only a few hours. The eruption varied also very much in the extent of surface that it affected, and sometimes it shifted rapidly from place to place, an irregularity always of evil omen.

The eye was affected in various ways, to which Dr. Kennedy attaches considerable importance in a semeiological respect. In cases where there was delirium, more or less injection of the sclerotica existed, which was very different from the ordinary suffusion of the eye met with in typhus fever. It was unattended with intolerance of light, but was a bad sign which, in fatal cases, went on increasing until death. In most of these cases the pupil was contracted; but another condition of it was by no means unusual, that of perpetual oscillation wholly independent of the quantity of light falling on it, "the iris, as it were, gave the impression that it was in a state of nervous tremor, sharing in this respect with the nervous system in the same patient." This also was a bad sign.

The danger of the case was usually proportioned to the rapidity of the pulse. During the period of collapse, the pulse was usually weak and indistinct; rising in the course of eight or twelve hours to 120 or 130, and gaining in fulness. It then grew gradually weaker till about the fourth day, when, if the patients did well, it usually increased in tone and vigour, and diminished in frequency. Extreme feebleness of pulse was a very bad sign, and an attendant on the worst cases.

We pass over the sixty pages occupied with the detail of cases, and come to Dr. Kennedy's remarks on the treatment of the affection. He usually began with the administration of an emetic, but on account of the tendency to diarrhea, did not employ either antimony or ipecacuanha for this purpose, but mustard mixed with water. In cases, too, when there was a very high degree of fever and incessant restlessness, he was accustomed to repeat the vomit, and with very good effect, for he has seen its employment followed by general calming of the system, and even by sleep. Cold and tepid ablutions, and cold affusion to the head were frequently practised, the former moderating the heat of skin, the latter checking some of the more violent forms of maniacal excitement, which were of by no means of rare occurrence. General bleeding was hardly ever admissible, and even local depletion required to be practised with much caution. Stimulants were very often employed, but there was nothing peculiar either in these he selected, or in his manner of adminstering them. He tried opium, though not very extensively, in three classes of cases. The first class included those instances in which typhoid symptoms appeared at an early period in the disease, and were associated with signs of great depression and weakness. Here, a full opiate at bed-time was often extremely useful, particularly in those cases in which delirium continued unabated after the other symptoms had begun to decline. Cases of the second class resembled those instances of typhus fever in which Dr. Graves has been accustomed to administer tartar emetic and opium. They were distinguished by the prominence of the head symptoms, by their early occurrence, and their not being at all mitigated by the full appearance of the eruption. Opium was very useful in some of these cases; on others, apparently, it did not exert the slightest influence. It did not effect more than a very temporary good in cases of the third class; those, namely, in which diarrhea came on in the progress of the disease.

Anasarca is the only one of the different sequelæ of the affection of which Dr. Kennedy has treated at all at length. He met with it much more frequently during the latter than the earlier part of the epidemic.

It usually appeared about the twelfth day of the disease, though occasionally it showed itself sooner, and still oftener at a later period. In those cases where it occurred, the pulse continued quick after the disappearance of the eruption, slight fever was present, and desquamation did not take place. After some days, the child would begin to complain of nausea, with vomiting occurring occasionally for two or three days, and headach of an intermittent character, with which a peculiar sluggishness of the pupils was usually associated. This state of the pupils, too, was very remarkable in some cases where a post-mortem examination failed to detect any morbid condition of the brain. After these symptoms had lasted for some days, the dropsy would begin to make its appearance, sometimes very gradually, the extremities or face being puffy on one day, and of their natural size on the day following; at other times the anasarca came on very suddenly. In one instance it proved fatal in three days, in another seven weeks elapsed from the appearance of the dropsy to the supervention of the first alarming symptoms. In those cases which assumed a serious character, either head symptoms came on, or the chest became affected, or lastly, the patient died without any organ being specially involved. The premonitory head symptoms were much the same with those of ordinary hydrocephalus, but a dilated condition of the pupils came on at a very early period, and coexisted with distinct vision. The breathing was irregular, and the pulse would often fall twenty or thirty beats, and rise again to its former frequency of about 120 in the course of forty-eight hours; always, however, becoming slow when coma or convulsions were about to occur. The cases in which death was ushered in by chest symptoms did not present anything very striking. In cases of the third class, the patients sank under the violence of the febrile symptoms, without special affection of any organ in particular.

With reference to the condition of the urine, Dr. Kennedy's remarks are extremely meager and unsatisfactory. He states that albumen was not always present, but the only test he used for it was heat; and we have no information as to its specific gravity in any case. The state of the blood too, the presence of urea in it, or in any of the effused fluids, are points which, despite their great importance, Dr. Kennedy does not appear to have investigated.

The treatment he adopted was strictly antiphlogistic, and included the free use of purgatives, and general or local depletion whenever any cerebral or thoracic complication existed.

The work which stands second at the head of this article, is a popular exposition of the symptoms of scarlatina, and of its homœopathic treatment, and contains nothing particularly novel or interesting. The only point indeed which we shall notice is the old recommendation of belladonna and aconite, as remedies and prophylactics of the disease. "According to the principle of homœopathy, *similia similibus curantur*, which means that diseases are cured by remedies capable of producing in a healthy body similar maladies, belladonna ought to be, and is the specific remedy for scarlatina." (Belluomini, p. 19.) Now here we meet with the fallacy that runs through the whole of the homœopathic theory. Similarity of symptoms, not similarity of diseases lies, as Schultz justly remarks, at the base of all their therapeutic proceedings, and if they

had not taken refuge in a Latin axiom, which has amply served the purpose of mystification, the so-called *scientific* theory of Hahnemann, would long since have been seen to deserve that character as little as did the old doctrine of signatures. The results obtained by the use of belladonna as a prophylactic are singularly conflicting; many of those who tried it and conceived that its use was attended by success, employed it in large doses; and M. Stievenant* of Valenciennes, whose paper on this subject was recently read before the Academy of Medicine in Paris, states expressly that the employment of belladonna in homœopathic doses did not give rise to any symptoms resembling those of scarlatina anginosa. M. Godelle has recently published an exceedingly prolix essay on scarlatina,† in which he labours to prove that belladonna is a prophylactic, but that its action, unlike that of vaccination, which destroys the liability to smallpox, is confined to removing the susceptibility to scarlatina during the time that it is employed, and ceases on its use being discontinued. Should this statement be substantiated, it may, perhaps, be the case that the narcotic power of belladonna, and of the kindred remedy aconite, blunts for the time the susceptibility of the constitution. On this supposition we might account for some who have been exposed to the contagion not contracting the disease. We confess that M. Guersant's favorable opinion of the prophylactic virtues of belladonna, make us hesitate in the expression of our disbelief in its powers. Still, it should be borne in mind, that the liability to scarlatina is much less than to smallpox and measles; that many persons pass through life without being affected by it: and that the general result of the more recent experiments with the drug were so much less favorable than those which were at first obtained, that Hahnemann was compelled to admit its frequent failures, and to resort to the supposition of a change in the fever, in order to explain the fact.‡ For those cases in which belladonna was not likely to be serviceable, Hahnemann suggested the use of aconite, in which he is followed by Dr. Belluomini and the rest of his disciples. We are not aware that aconite has been by any means so extensively tried as belladonna. Dr. Belluomini appears to believe, that with the two together, we might soon put an end to scarlatina in all its forms.

"Belladonna is only a preservative against smooth scarlatina, and therefore, it remains without effect when the prevailing epidemic is miliary scarlatina. Against this the preservative is aconite. Now as these two epidemics reign almost always at present promiscuously, whenever prudence suggests the use of a preservative, aconite and belladonna should be administered alternately. The doses of these medicines ought to be the same as those indicated for the cure, but taken at long intervals, beginning with aconite when miliary scarlatina is dreaded, and with belladonna if it be smooth scarlatina, and continuing the use of these medicines alternately. To aconite one day is the time which should be allowed for completing its action; to belladonna from three to six days should be given. In robust and active persons who perspire much, the action of belladonna will be extinct in the course of about three days; in persons in different conditions, its action may continue for six or seven days." (p. 27.)

* Bulletin de l'Académie Royale de Médecine, 15 Fevrier, 1843.

† Revue Médicale, Janvier, Mars, et Avril, 1843.

‡ Those who wish to see a brief summary of the various experiments on the prophylactic powers of belladonna will find it in Meissner's Forschungen, bd. iii, s. 302, and bd. vi, s. 441.

Dr. Bodenius's very wordy pamphlet may be divided into two parts, the first of which contains a report on the employment of the carbonate of ammonia, in an epidemic of scarlet fever that prevailed in the neighbourhood of Bretten, in the duchy of Baden, during the years 1837-8. He is so convinced of the specific virtues of this remedy, as to hazard the bold assertion that the "carbonate of ammonia will acquire the same importance as a remedy for scarlet fever, as is attached to vaccination as a preservative from smallpox." (p. 9.) The epidemic presented both forms of the disease, namely, the simple smooth scarlatina, and also the miliary variety. Both were characterized by severe affection of the throat, and swelling of the parotid glands occurred in three fourths of the cases. In addition to strict attention to the ordinary dietetic rules, it was his custom to employ the following mixture from the very outset of the disease.

℞ Ammon. carbon. . . . ʒss—ʒj.
Aq. destill. . . . ℥iij.
Syr. Altheæ . . ℥j. M.

Of this mixture one or two teaspoonfuls were given every two hours, and continued, by night as well as by day, through the whole course of the fever, until the period of desquamation set in, when it was given only every four hours. Its action, when employed at the commencement of any case, was to quell the very troublesome vomiting which attended the outset of scarlatina, and afterwards to induce increased and as he considered, critical secretion from the kidneys.

The second and by far the larger part of the pamphlet contains a clumsily executed *résumé* of the opinions of different writers on scarlatina, and especially of the fluctuations that the carbonate of ammonia has undergone in the esteem of the profession. We call attention to the subject because we are convinced, from tolerably extensive experience, that though the remedy may not merit all the eulogies of Dr. Bodenius, it is nevertheless one of very great value in the treatment of scarlatina; that it deserves to be looked on in quite a different light from other stimulants, that it may be given advantageously under circumstances when the employment of other stimulants would be improper, and may often be used with benefit from the very commencement of the disease.

ART. XVI.

Familiar Letters on Chemistry, and its relation to Commerce, Physiology, and Agriculture. By JUSTUS LIEBIG, M.D. PH.D. F.R.S., Professor of Chemistry in the University of Giessen. Edited by JOHN GARDNER, M.D., Member of the Chemical Society.—*London,* 1843. 12mo, pp. 180.

THESE letters, as we learn from the author's preface, were intended to be mere sketches of some of the most important subjects on which chemistry comes into immediate relation with human welfare; and were written for the especial purpose of exciting the attention of governments and an enlightened public, to the necessity of establishing schools of chemistry, and of promoting, by every means, the study of a science so intimately connected with the arts, pursuits, and social well-being, of modern civilized nations. In consequence of the publication of some of these letters in Germany, new professorships have been established in

the universities of Göttingen and Würtzburg, for the express purpose of facilitating the application of chemical truths to the practical arts of life, and of following up the new line of investigation and research,—the bearing of chemistry upon physiology, medicine, and agriculture,—which may be said to be only just begun. "For my own part," says the author, "I do not scruple to avow the conviction, that ere long a knowledge of the principal truths of chemistry will be expected in every educated man; and that it will be as necessary to the statesman and political economist, and to the practical agriculturist, as it is already indispensable to the physician and the manufacturer."

The first five of these letters embrace several interesting facts relating to the application of chemistry to manufacturing processes,—such as the production of soda, sulphuric acid, soap, &c.; the remaining eleven contain a *resumé* of the author's doctrines, in regard to the bearing of chemistry upon animal and vegetable physiology, agriculture, &c.,—subjects which are more fully discussed in his larger treatises. His views are here presented in a very clear and definite form; and there is a studied avoidance of controverted questions, whilst great stress is laid upon a few prominent and easily-substantiated facts, which have an important practical bearing. Such is especially the case, in the portion which relates to agriculture; and we shall take this opportunity of directing the attention of our readers to the views at which Professor Liebig has arrived subsequently to our review of his 'Organic Chemistry applied to Agriculture;' referring to the third edition of that work, just published, for a more detailed enunciation of them, and for the data on which they are founded.

It will be remembered that many facts and arguments were adduced by Liebig in proof of the position that vegetables, during their ordinary growth, derive little or none of their carbon from the *humus* of the soil, but are indebted for it entirely to the atmosphere. The case of a plantation on a barren mountain side, which goes on year after year increasing in size, and at the same time adding to, rather than diminishing, the quantity of carbon in the soil, was especially adverted to. He has now adopted similar views respecting the source of the nitrogen, which the plants cultivated for food take up in large quantities; and the following circumstance appears to prove this beyond a doubt. The materials of cheese are entirely derived from the plants which serve as food for cows. The meadows of Holland have, in the lapse of centuries, produced millions of hundreds weight of cheese, of which a large proportion has been exported from the country, and of which, therefore, the azotized materials have been completely withdrawn, without any corresponding return being made. The only manure with which these meadows have been supplied, consists of the solid and fluid excrements of the cattle which pasture upon them; and these return to the soil the saline and earthy ingredients which have been withdrawn from it, but only a portion of the carbon and nitrogen that entered into the composition of the food. Yet these meadows retain their fertility, which could not be the case if more carbon and nitrogen were thus withdrawn than could be supplied by the atmosphere.

The great value of manures consists, therefore, according to Prof.

Liebig, in their imparting to the soil the *mineral* ingredients required by the particular kind of plants which are to be raised. It is true that, by the use of manures which yield a copious supply of carbonic acid and ammonia, *time* may be saved,—the growth of the plant being forced by the increased supply of food; but these will be totally inefficacious, if the mineral matters be not supplied in an equivalent proportion; and the latter used alone will frequently answer the required purpose. Now all those vegetable substances which are cultivated for the food of man and animals, from our experience of their nutritive properties, contain a considerable amount of the alkaline and earthy *phosphates;* and the maintenance of a sufficient supply of these in the soil should be, in Prof. Liebig's estimation, the great object of the agriculturist. We give large extracts from his closing letter, on account of the vast practical importance of the subject, and our desire to lose no opportunity of calling general attention to his suggestions.

"An enormous quantity of these substances, indispensable to the nourishment of plants, is annually withdrawn from the soil, and carried into great towns, in the shape of flour, cattle, &c. It is certain that this incessant removal of the phosphates must tend to exhaust the land, and diminish its capability of producing grain. The fields of Great Britain are in a state of progressive exhaustion from this cause, as is proved by the rapid extension of the cultivation of turnips and mangel-wurzel,—plants which contain the least amount of the phosphates, and therefore require the smallest quantity for their development. These roots contain 80 to 92 per cent. of water. Their great bulk makes the amount of produce fallacious as respects their adaptation to the food of animals; inasmuch as their contents of the ingredients of the blood, i. e. of substances which can be transformed into flesh, stands in a direct ratio to their amount of phosphates, without which neither blood nor flesh can be formed.

Our fields will become more and more deficient in these essential ingredients of food, in all localities where custom and habits do not admit the collection of the fluid and solid excrements of man, and their application to the purposes of agriculture. In a former letter I showed you how great a waste of phosphates is unavoidable in England, and referred to the well-known fact, that the importation of bones restored in a most admirable manner the fertility of the fields exhausted from this cause. In the year 1827 the importation of bones for manure amounted to 40,000 tons; and Huskisson estimated their value to be from £100,000 to £200,000 sterling. The importation is still greater at present; but it is far from being sufficient to supply the waste.

"Another proof of the efficacy of the phosphates in restoring fertility to exhausted land, is afforded by the use of the *guano,*—a manure which, although of recent introduction into England, has found such general and extensive application.

"We believe that the importation of one cwt. of *guano* is equivalent to the importation of eight cwt. of wheat; the cwt of guano assumes, in a time which can be accurately estimated, the form of a quantity of food, corresponding to eight cwt. of wheat. The same estimate is applicable in the valuation of bones.

"If it were possible to restore to the soil of England and Scotland the phosphates which during the last fifty years have been carried to the sea by the Thames and the Clyde, it would be equivalent to manuring with millions of cwts. of bones, and the produce of the land would increase one third, or perhaps double itself, in five to ten years.

"We cannot doubt that the same result would follow if the price of the guano admitted the application of a quantity to the surface of the fields, containing as much of the phosphates as have been withdrawn from them in the same period.

"If a rich and cheap source of phosphate of lime and the alkaline phosphates

were open to England, there can be no question that the importation of foreign corn might be altogether dispensed with in a short time. For these materials England is at present dependent upon foreign countries, and the high price of guano and of bones prevents their general application and in sufficient quantities. Every year the trade in these substances must decrease, or their price will rise as the demand for them increases.

"According to these premises, it cannot be disputed that the annual expense of Great Britain for the importation of bones and guano is equivalent to a duty on corn; with this difference only, that the amount is paid to foreigners in money.

"To restore the disturbed equilibrium of constitution of the soil,—to fertilize her fields,—England requires an enormous supply of animal excrements; and it must therefore excite considerable interest to learn, that she possesses beneath her soil beds of fossil *guano*,—strata of animal excrements, in a state which will probably allow of their being employed as a manure at a very *small* expense. The coprolithes, discovered by Dr. Buckland, (a discovery of the highest interest to geology,) are these excrements; and it seems extremely probable that in the strata England possesses the means of supplying the place of recent bones, and therefore the principal conditions of improving agriculture,—of restoring and exalting the fertility of her fields.

"In the autumn of 1842, Dr. Buckland pointed out to me a bed of coprolithes in the neighbourhood of Clifton, from half to one foot thick, inclosed in a limestone formation; extending, as a brown stripe in the rocks, for miles along the banks of the Severn. The limestone marl of Lyme-Regis consists for the most part of one fourth part of fossil excrements and bones. The same are abundant in the lias of Bath, Eastern and Broadway Hill. Near Eversham, Dr. Buckland mentions beds several miles in extent, the substance of which consists, in many places, of a fourth part of coprolithes.

"Pieces of the limestone rock of Clifton, near Bristol, which is rich in coprolithes, and organic remains, fragments of bones, teeth, &c., were subjected to analysis, and were found to contain above 18 per cent. of phosphate of lime. If this limestone is burned and brought in that state to the fields, it must be a perfect substitute for bones, the efficacy of which as a manure does not depend upon the nitrogenized matter, as has been generally but erroneously supposed, which they contain, but on their phosphate of lime.

"The osseous breccia found in many parts of England deserves especial attention, as it is highly probable that in a short time it will become an important article of commerce.

"What a curious and interesting subject for contemplation! In the remains of an extinct *animal* world England is to find the means of increasing her wealth in agricultural produce, as she has already found the great support of her manufacturing industry in fossil fuel,—the preserved matter of primeval forests, the remains of a *vegetable* world May this expectation be realized; and may her excellent population be thus redeemed from poverty and misery." (pp. 174-9.)

We suspect that the learned Professor of Oxford must have unintentionally misled the Giessen chemist, by the enthusiasm of manner which he probably showed when demonstrating to him his favorite bed of coprolithes. For, on the information of a friend well versed in the geology of the places alluded to, we may state that it would be no easy matter to collect from them a cart-load of coprolithes; so that Britain must not place too much reliance on her *fossil* stores of phosphate of lime, but must devise means of taking care of the *recent*.

ART. XVII.

1. *A Manual of Medical Jurisprudence.* By ALFRED S. TAYLOR, Lecturer on Medical Jurisprudence and Chemistry at Guy's Hospital. —*London*, 1843. Sm. 8vo, pp. 680.
2. *Principles of Forensic Medicine.* By W. A. GUY, M.B. Cantab., Professor of Forensic Medicine at King's College, London.—*London*, 1843. Sm. 8vo. Parts I & II.

WE regret that the absurd plan of publishing *in Parts*, adopted, in the case of the work second on our list, prevents our including Dr. Guy's incomplete volume in our present notice. Our available space will also permit us to give only a very brief account of Mr. Taylor's work. Perhaps, when noticing Dr. Guy's volume, on its completion, (of which our knowledge of the talents and learning of the author leads us to augur excellent things,) we may be able to do more justice to the very admirable treatise, which we can only introduce to our readers on the present occasion. Mr. Taylor has done injustice to himself in naming his book *a Manual;* small as the volume appears, and singularly cheap as it is, it is in reality not only the best and completest treatise on medical jurisprudence to be found in any language, but it is, in extent, one of the largest. By means of Mr. Palmer's Lilliputian type, Mr. Churchill has contrived to cheat his customers into the purchase of a huge systematic treatise, under the guise of a pretty little hand-book, and at the seductive cost of only a dozen shillings. Now we by no means object to the smallness of the price, and should not quarrel with Mr. Churchill if he sold us the book for half the sum : but verily our post-climacteric vision, aching from a long session over the alluring pages, bids us ask, whether it is really necessary thus to crowd the matter of two or three large octavo volumes into one small one? The print is clean and clear, we allow, and the paper fair and good,—and possibly the sharp-sighted frequenters of the schools and hospitals may fail to discover the typographical defects which are so painfully conspicuous in our old eyes. Possibly, also, when the publisher reckons up his thousands of purchasers among the young, he will care little for the discontent of the few hundreds of spectacled grumblers, like ourselves. But we shall have one revenge, nevertheless; and, accordingly, here warn all and sundry of our sexagenarian colleagues, neither to buy nor borrow "Taylor's Manual," but to get some of their juvenile acquaintances to read to them, from their own copies, the indispensable information it contains.

The great importance of medical jurisprudence, as a branch of medical study, is well shown in a few brief paragraphs in Mr. Taylor's preface; to which we entreat the attention of all our junior readers, whether students or practitioners:

"MEDICAL JURISPRUDENCE, whereby we are to understand *that science which teaches the application of every branch of medical knowledge to the purposes of the law*, is now so well known as to render it unnecessary for me to enter into any explanation of its objects. Its claims, as a distinct science, to the attention of the profession rest upon two grounds; 1st, that the subjects of which it treats are of practical importance to society; and 2d, that they are not included in the other branches of a medical education.......

"It is unnecessary for me to remark that great responsibility is attached to the duties of a medical witness, and that any member of the profession may find himself involved in this responsibility, from circumstances of a merely accidental

nature. When a crime, requiring medical evidence for its elucidation, is perpetrated, the duty of the whole investigation commonly devolves on the practitioner, who lives nearest to the spot; it is therefore virtually upon his knowledge and experience, that the clear proof of the crime and the legal punishment of the offender, must rest.......

"Some medical practitioners are disposed to treat medico-legal inquiries with indifference. They are apt to think, that cases are rare; and that they may easily escape any grave responsibility when they occur. *I have never known this indifference manifested by one, who had once been summoned as a medical witness to a court of law;* and as to the rare occurrence of cases, I may perhaps be permitted to make the following remarks. From some recent Parliamentary returns, it appears that in one year in the United Kingdom, there were 1213 trials involving questions of murder and manslaughter, either perpetrated or attempted from POISONING and WOUNDS alone, in every one of which medical evidence was necessary, and in the majority, indispensable to conviction. In two years, there were 541 deaths from poison in England and Wales alone, in the greater number of which, medical evidence was absolutely required. This is exclusive of criminal attempts at poisoning not followed by death." (Pref., pp. 5-9.)

The shrewd remark in the last extract, which we have put in italics, contains a most forcible *argumentum ad hominem*, which every young practitioner would do well to listen to; and we can honestly say we know of no means so likely to fortify him against the distressing contingency hinted at, as the attentive study of Mr. Taylor's book.

The plan and arrangement of the contents of this volume are entirely practical, and sufficiently indicate that the author has fully profited by his long experience as a teacher and medical jurist. In this respect, as in many others, the volume differs from all its predecessors.

"The only arrangement which it has appeared to me advisable to follow, has been that of placing the subjects in the order of their importance. Thus POISONING, WOUNDS, and INFANTICIDE, constitute more than three fourths of those cases which require the aid of a medical jurist in a court of law. Hence these have been treated at a length commensurate with their importance. The subjects are examined in the form of questions, and those on TOXICOLOGY, more especially in reference to general poisoning, have been framed, with some modifications, on the plan originally proposed by Orfila and Christison. The arrangement of the questions, relative to WOUNDS and INFANTICIDE, has been chiefly derived from an analysis of the medical evidence given on the numerous trials connected with those crimes during the last fourteen years. By this arrangement, it is expected that every point of any practical interest will be brought before the reader. A large number of the cases in this Manual have never before been published. They are entirely derived from modern sources, and it is anticipated that these will be much more serviceable to the practitioner as illustrations of the duty required of him, than those drawn from old and obsolete annals. Some of these cases I have been able to collect by my connexion with Guy's Hospital,—many have been kindly furnished to me by those gentlemen, who, in the course of the last thirteen years, have attended my lectures on Medical Jurisprudence in that institution; and others again I have derived from the quarterly and weekly medical periodicals of England, Scotland, France, and Germany. Where the limits of the subject would not allow me to introduce illustrative cases, ample references have been given, so that the medical or legal student, who requires further information on particular questions, may easily obtain it." (Pref., pp. 5, 6.)

The following is a brief synopsis of the whole contents:

I. Poisoning	treated in	27	Chapters.
II. Wounds	,,	14	,,
III. Infanticide	,,	8	,,
IV. Death from drowning	,,	1	,,
V. Hanging	,,	1	,,

VI. Strangulation .	treated in	1	Chapter.
VII. Suffocation . .	,,	2	,,
VIII. Lightning, cold, starvation	,,	1	,,
IX. Rape . .	,,	1	,,
X. Pregnancy, delivery	,,	2	,,
XI. Birth, inheritance .	,,	1	,,
XII. Legitimacy .	,,	2	,,
XIII. Insanity . .	,,	4	,,

The practical character of Mr. Taylor's treatise has led him to give only a subordinate place to several topics which other authors have dwelt largely on. Although we entirely agree with the author as to their small relative importance, we still think it would have been useful, for the sake of more convenient reference, to have given to each of these subjects a separate consideration. These are Mr. Taylor's reasons:

"With respect to FEIGNED DISEASES, the duties of a practitioner rarely go beyond the detection of feigned poisoning, wounds, pregnancy, delivery, and insanity; and an account of these will be found in the chapters on those subjects. The practical points connected with AGE, IDENTITY, and SURVIVORSHIP, as they concern a medical witness, will be found scattered throughout the volume. In almost every case of AGE or IDENTITY the question is settled by the evidence of non-professional witnesses; and it has therefore seemed to me improper to introduce distinct chapters upon such subjects to the necessary exclusion or abbreviation of other cases which are of much greater practical importance and more frequent occurrence." (Preface, p. 7.)

To give anything like an analysis of this work would require ten times the space that we can now afford; and, to say truth, we would hardly attempt such a task even if we were unhampered in this respect. This is not one of those sappy and windy productions which the industrious analyst concentrates into an essence for the benefit of the indolent or fastidious; nor one of those whence the cunning critic may extract a spicy kernel from its mountain of husk: it must be had in its own bodily form, must be read, studied, and kept for reference. Wherefore we consider that we shall best fulfil our duty to our readers by limiting our present labours to a concise exposition of what they will find in Mr. Taylor's book.

Chapter I is, we believe, new in works on medical jurisprudence. It involves the consideration of what substances should be regarded as poisonous and what not, a point on which medical witnesses have differed much on trials for poisoning. The subject is of some interest in relation to death from over-doses of saline medicines, commonly reputed inert, as in respect to salt (p. 2), sulphate of magnesia (p. 3), and sulphate of potash (pp. 131 and 594.) The late case of the Queen v. Haynes is, in this respect, of some importance. The medico-legal facts connected with mechanical irritants are also fully stated. (p. 8.)

In Chapter II, "On the mode of action of poisons," the author has followed Orfila and Christison. An experiment is related at page 15, where ferrocyanate of potash was detected not merely in venous blood, but in the contents of the thoracic duct. We think that the facts connected with the detection of poisons in the blood, are more recent and more fully and practically stated than in either Orfila or Christison.

In Chapter III, the author has followed Dr. Christison in adopting the classification proposed by Orfila, but has formed more practical subdivisions of the irritant poisons. He has also here set down, in a few simple

tables, the names of all those substances which have either destroyed human life, or have given rise to serious symptoms. (p. 24.)

Chapter IV, "On the rules to be observed in investigating a case of poisoning," seems to us entirely new in its plan, in works of this kind. It cannot fail to be very useful in obviating the difficulties experienced by young practitioners on first entering on the medico-legal investigation of poisoning.

In Chapters V, VI, VII, VIII, the mode of examining the evidence of poisoning is detailed. The plan of these four chapters has been derived from Orfila, who in this was followed by Christison; and it does not appear that any better plan could be devised. The author's opinions are deduced from the occurrence of actual cases, many of which are new, and are now reported for the first time in a work on medical jurisprudence. They are accompanied by comments to show their practical bearing.

Chapters IX and X present some novelty in the mode in which the subject of poisoning is therein treated. In Chapter X are some valuable statistical tables, condensed and arranged, showing the frequency of the occurrence of cases of poisoning, (p. 83;) and what are the substances which specially claim the attention of a practitioner. Tables of this kind have not, to our knowledge, before appeared in any medico-legal work.

With respect to the chapters on the Poisons individually, the author has classified the main medico-legal questions in distinct paragraphs. Most medico-legal writers have done this with respect to symptoms and treatment; but here will be found described in addition, under every poison, 1st, the *quantity* required to destroy life, the *smallest* quantity which has killed, the *largest* quantity from the effects of which a person has escaped; 2d, the period within which each poison commonly destroys life, including the *shortest* fatal period, and the *longest* fatal period known. Dr. Christison has followed the same plan with respect to two or three poisons; but his remarks are on these points very limited, (we say this without imputing any blame to him,) and are mixed up with other subjects. Mr. Taylor has here collected a vast number of cases, which had not even occurred when Dr. Christison published his earlier editions.

The chemical analysis of each poison is very full, and the objections to each test, and the answers to the objections are carefully pointed out, —a circumstance hitherto but little attended to in medico-legal treatises. Chemical evidence has often failed, simply because a medical witness could not satisfactorily answer the objections which were made to the tests.

In the chapters on "General poisons," the author has shown that they may be detected in organic matter after many years' exposure to decomposition,—in the case of sulphuric acid, for twelve years; of arsenic, for nine years, &c. &c. To each poison is appended an account of the method of determining the *quantity present* in a given mixture, a most important medico-legal question, but, strange to say, wholly omitted by those otherwise excellent authorities, Orfila and Christison.

Chapter XX (p. 216) is, we believe, new in medico-legal toxicology; it presents the arrangement of the principal poisons in tables, so as to show, at one view, the results of numerous selected tests, whereby the nature of most poisons may be determined in a few minutes. Orfile

published some analytical tables a few years ago; but they were complicated and defective, and more chemical than toxicological. The present tables cannot fail to be of the greatest service to practitioners.

The second great subject, "Wounds," is treated in a masterly manner in the next fourteen chapters. The arrangement is evidently derived from practical observation of what is most important in cases likely to become the subject of legal investigation. Like all the other subjects, it is illustrated by a great number of original cases. We would call the attention of our readers, in a particular manner, to the excellent account given of the value of *blood-stains* as evidence, in Chapter XXXIV; and to the observations in regard to *locomotion,* &c., after wounds, in Chapter XXXIII. These contain numerous very interesting facts and conclusions of the highest importance, which have not hitherto met with the consideration they deserve. The same remarks apply to Chapter XLI, "On gunshot wounds," which is full of the most interesting details, never before published in any work of this kind.

The third main subject of the work, "Infanticide," is comprehended in eight chapters; which, in our judgment, leave nothing of any importance unnoticed, and lay down the soundest views of disputed points.

In Chapter LII, on "Hanging," among other interesting matter, will be found some important facts connected with the proofs of hanging in the living and dead subject, founded on Casper's experiments, published some time since in this Journal.

Chapter LIV, on "Suffocation by carbonic acid," is also of especial interest and importance; and contains many original experiments and observations. (p. 555.)

Chapter LVII, on "Rape," and Chapter LX, on "Birth and inheritance," involve some new and curious medico-legal points.

The four chapters on "Insanity" comprehend all the medico-legal facts relating to that most important subject; one chapter (LXV) being devoted to the consideration of responsibility for crime, and the medical and legal tests of insanity.

In an Appendix we have (A) a list of the tests and apparatus required in poisons; and (B) an abstract of the provisions of the Medical Witnesses' Act before Coroners; both of which are likely to be of great service to a practitioner.

In conclusion, we can conscientiously say of this book, that it presents, in our judgment, as complete and perfect a view of the whole subjects of which it treats, as the present state of our knowledge and the extent of the allotted space admit of. Everywhere the author demonstrates his practical familiarity with his subject; while the conclusions come to on all disputed points, seem the natural products of a masculine understanding and sound judgment, tested and chastened by a long experience. As well in the matter of materials, as in the manner of treating many of the questions, there is much more originality in this work than might be expected, either from the general subject of it or from its unpretending form. Through it the author has assuredly entitled himself to be considered as one of the most accomplished medical jurists of present or former times. It would be superfluous, after such praises, to recommend, in more formal terms, the 'Manual of Medical Jurisprudence' to the attention and careful study of all our readers.

ART. XVIII.

The Oculist's Vade-mecum: a complete Practical System of Ophthalmic Surgery. By JOHN WALKER.—*London*, 1843. 12mo, pp. 400. One coloured plate, and Twenty Woodcuts.

THAT to make a book on the diseases of the eye, and even a long and a tedious one, is no difficult task, is sufficiently proved by the many ponderous volumes on that subject which load the shelves of our medical libraries. To give a novel and succinct account of this class of maladies in a perspicuous and readable style, is not so easy: we think Mr. Walker capable of doing this; but we are sorry that this has not been so much his object in the present work, as that of abridging the productions of his laborious predecessors. The work he has undertaken to do, however, he has accomplished with considerable success.

We cannot flatter Mr. Walker as to the "pictorial illustrations," as he is pleased to call them, which accompany his book. He hopes that they will "add materially to the value of the work." We think they had much better been omitted. They must add to the price, while they appear to us for the most part of little or no use.

"It forms no part of the object of this treatise," says Mr. Walker, "to enter into abstruse disquisitions on the nature of those actions which give rise to the phenomena of ocular disease, but rather the more practical one of describing, as accurately as possible, the phenomena themselves, their causes, and, more especially, the treatment they require." (p. 2.)

In pursuing this object, Mr. Walker gives a detailed account of what is most important in each of these topics, in relation to the various diseases of each individual structure of the eye, commencing with those which are external, viz. the conjunctiva, cornea, and sclerotica; and afterwards proceeding to those deeply seated; the iris, the choroid, and the retina. Then follows the consideration of the affections of the aqueous, crystalline, and vitreous humours, and their capsules. He next enters on the subject of those diseased conditions which simultaneously involved the whole, as well as those few anomalous affections, which, from the uncertainty as to what parts they really reside in, could not properly be classed with the preceding. Lastly, the morbid state of the appendages claim our author's attention.

The nature of the work does not claim an extended or critical notice from us; we will, however, advert to a few particulars which we noted for comment during perusal.

We cannot admit that Mr. Walker has described any specific disease of the eye under the head of "simple ophthalmia." Most of the cases which he would class under this name are, we are persuaded, nothing else than instances of catarrhal ophthalmia, while others of them are examples of the sympathetic redness of the conjunctiva, attending inflammation of the deeper textures, such as the iris. The case related in page 11, we regard as one of iritis, attended with conjunctival redness. The case in page 18, appears to have been scrofulous ophthalmia. Pustular ophthalmia, which is surely a very different disease from either catarrhal or scrofulous ophthalmia, differs but little, Mr. Walker tells

us (p. 63) from his "simple ophthalmia." Such is the confusion arising from admitting into a nosological arrangement, a disease which has no specific character of its own, but merely borrows an existence, so to speak, from a group of others.

Among the remedies mentioned by Mr. Walker, we are sorry to observe sugar of lead (p. 17), a substance, which, on account of the deplorable effects it produces when there happens to be any degree of ulceration of the cornea present, we had believed to be discarded from ophthalmic practice.

Mr. Walker is extremely fond of the solid nitrate of silver. He seems to have recourse to it, even in the most trifling cases of inflammation of the eye. For example, in pustular ophthalmia, (p. 66,) he touches the inside of the lower lid with the caustic, a piece of practice we should deem quite superfluous. In ulcer of the cornea, also, he applies the same remedy to the conjunctival surface of the lower lid. (p. 124.) He tells us (p. 19) that the use of this favorite application sometimes produces ulceration of the conjunctiva, and even that "inversion of the lid results from it." Now, if such consequences arise in the cautious and experienced hands of Mr. Walker, assuredly in those of ordinary practitioners, for whom the work before us is in a great measure intended, the remedy would prove, in general, ten times more dangerous than some of the slight affections which Mr. Walker recommends to be treated with it.

Mr. Walker's description of purulent ophthalmia is good, and the discussion into which he enters on the various points of treatment is shrewd and interesting. We think he estimates antiphlogistic treatment too low, and trusts too exclusively to stimulants. He utterly repudiates bleeding, (p. 36,) as likely to favour sloughing of the cornea, and regards the solid nitrate of silver as the sheet-anchor in the treatment of purulent ophthalmia. He applies it freely to the conjunctiva for a few seconds, once a day, insinuating it beneath the margin of each lid. If a sloughing condition of the cornea seems impending, Mr. Walker recommends a generous diet, wine and quinine. The case of Mr. A. (p. 52) is instructive. The treatment was commenced on the second day of an attack of gonorrheal ophthalmia; all the symptoms were of an aggravated character; ulceration of the cornea was already apparent; chemosis was developed to the fullest extent, and the tension of the lids was excessive. A cure was accomplished without the abstraction of a drop of blood, and with no other local applications than the lunar-caustic pencil to the conjunctiva, and warm water to the cutaneous surface of the lids.

It is well known, that after the secondary fever of smallpox, inflammation is apt to attack the eye, and to destroy it. Mr. Walker thinks (p. 82,) that this occurs under the form of severe catarrhal or purulent ophthalmia, which most assuredly is not the case. The form under which it occurs is that of abscess within the substance of the cornea, ending in extensive ulceration. His plan of treatment, applying nitrate of silver freely to the conjunctival surface, would probably put out the eye. He does not seem to have tried it, and we hope he never will.

Mr. Walker makes a laboured attempt (pp. 89, 90,) to explain the triangular shape of pterygium, but leaves the matter no clearer than he found it. It is evidently often the case that this disease arises from the

existence of an elevated point, at the edge, or on the surfaces of the cornea, to which, as a cause of irritation, the enlarged vessels of the conjunctiva are attracted. We have our doubts, whether some such cause is not always in existence. If it is so, the triangular form of the enlarged vessels ceases to be at all mysterious.

For the relief of the imperfect vision which results from conical cornea, Sir W. Adams proposed a removal of the lens, and some one referred to, but not named, by Mr. Middlemore, has advised an artificial pupil. Mr. Walker has combined these two plans, first making an artificial pupil behind the edge of the cornea, and then extracting or dividing the lens. He relates an interesting case, in which the result of the operative proceedings was highly satisfactory, so far as the first eye was concerned. In the second, the artificial pupil was successfully formed, but inflammation followed the extraction of the lens, and destroyed the eye. (p. 145.) In the second eye, it would have been satisfactory to have tried extraction before forming the artificial pupil, as putting Sir W. Adam's plan to the test. Had the eye recovered from the extraction, but vision remained as before, the artificial pupil might have been formed.

At page 158, Mr. Walker states that thickening or deposition never affects the sclerotica, in consequence of inflammation. The reverse is the fact; a thickened and fleshy, and sometimes a thickened and pearly appearance, is a frequent result of the disease termed sclerotico-choroiditis, the same disease which in a more advanced stage gives rise to attenuation of the sclerotica, and protrusion of the choroid.

Speaking of staphyloma scleroticæ, Mr. Walker says, it is necessary to excise the whole cornea, or at least a considerable part of it, and, in some cases, the projecting portion of the sclerotica also, to effect the sinking of the eye. (p. 166.) Now, when the staphyloma surrounds the whole cornea, and the eye is greatly enlarged, no doubt the anterior third of the eye, or thereabouts, including the cornea, must be removed; but if the staphyloma is confined to one side of the eye, it is sufficient to remove the part affected, leaving the cornea untouched.

The figure of coloboma iridis given in page 208, is incorrect. The natural pupil always exists to the full extent in that malformation, and added to it is a prolonged slit, generally downwards, but sometimes to one side. Mr. Walker's figure represents the natural pupil as in a great measure wanting.

The old-fashioned question about the proper season for operating for cataract has lately been revived in this country. The following is Mr. Walker's opinion upon this point:

"Some writers insist that an operation for extraction of cataract ought not to be undertaken during the winter season. I confess that I see nothing in the objection. If the patient be in good health at the time, I should say that there is nothing adverse in the season of winter. A more reasonable objection might be urged against the great heat and bright sunlight of summer, which are more difficult to guard against than the cold of winter. My own experience leads me to conclude that the operation is at least as successful in winter as in summer. In this country, where usually the winters are mild, and the seasons temperate, the periods are few and of short continuance in which the operation would be improper. Of the two, I should certainly more strongly object to the summer, but I should also decline operating in a very frosty season." (p. 252.)

Mr. Walker gives five cases of extraction of cataract, (p. 260,) which will be read with interest even by those who have operated much, and ought to be studied attentively by those who have not yet operated. The following remarks on the unfavorable results of the operation of division, we deem important.

"A not unfrequent termination of the operation of division and the subsequent absorption of the cataract and one which I conceive has not been sufficiently pointed out, is that of atrophy of the eye. It would seem that the process of absorption is not always limited to the cataract, but occasionally extends to the vitreous humour and the other structures of the globe. I have seen many instances of such a result, not confined, indeed, to the operation for cataract, but likewise in cases where the lens had been injured by sharp instruments accidentally passed into the eye. Nor is it to be wondered at that the repeated introduction of an instrument within the interior of the eye, a proceeding which must inevitably break up the delicate cells of the vitreous body, together with the irritation consequent thereupon, and on the presence of the disorganized lens, combined with an unnatural excitement of the absorbent vessels, kept up for many weeks or months,—should be succeeded by a much greater amount of absorption than was originally contemplated, and that ultimately a large portion of the fluid contents of the globe should disappear. The wonder is, that so much can be done in the way of interference with the vitreous body, during the various operative proceedings on the eye, with such frequent impunity." (pp. 277-8.)

Hydrophthalmia between the conjunctiva and sclerotica is, as far as we recollect, a disease hitherto undescribed:

"A labouring man presented himself at the hospital, in whom there was a considerable quantity of fluid collected between the conjunctiva and sclerotica, forming a tumour of some size all around the front of the globe, constituting a case of *hydrophthalmia externa.* In this instance the eye had been previously lost by an accident, the cornea had become opaque, and the eye-ball much shrunk; but the presence of this watery swelling gave to the eye the appearance of being more prominent than natural. The fluid, which was contained in three or four separate compartments, apparently communicating with each other, was evacuated by a puncture, but speedily collected again; afterwards the conjunctiva was dissected off, and no further secretion of the fluid took place." (p. 310.)

Opening the cornea by a large incision, removing a portion of it, and afterwards poulticing the eye, as practised by Mr. Barton, appears to answer in cases of pieces of percussion-caps lodging within the eye. The foreign body escapes, and the irritation ceases. Of this, Mr. Walker gives an illustration at page 323. The extension of the practice to cases of lacerated eye, producing sympathetic retinitis of the opposite eye, does not appear so likely to do good. It failed in a case related by Mr. Walker at page 328. "Its failure," observes our author, "was probably to be attributed to the advanced state of the disease, and to the circumstance of the operation not having been resorted to at a sufficiently early period."

If, in the above brief remarks, we have mingled a large proportion of criticism, we can assure Mr. Walker it is from no desire to depreciate the value of his work, which, as a whole, does him a great deal of credit, and will undoubtedly prove, to many, a useful introduction to the study of the diseases of the eye.

ART. XIX.

Cases of Dropsical Ovaria, removed by the large abdominal section. By D. HENRY WALNE.—*London*, 1843. 8vo, pp. 66.

THIS pamphlet is a reprint from the Medical Gazette of the particulars of three cases, in which Mr. Walne removed dropsical ovaria with success. The history of the first of these cases is contained in the notice of Dr. Clay's paper, which appeared in our last Number; where will be found also such particulars, with reference to the second case, as Mr. Walne had communicated to the editor before the article went to press. We need, therefore, only mention, that the patient was fifty-seven years old; that her convalescence after the operation was retarded by an attack of phlegmasia dolens, but that, eventually, though slowly, she regained her health. The subject of the third operation was twenty years old, and unmarried; her recovery was not attended with any symptoms of really grave character. Want of space compels us to notice these cases very briefly; but it is only justice to Mr. Walne to say, that he appears to have watched his patients with unremitting care, and to have conducted their treatment very judiciously; to which the successful result of the operations was no doubt in great measure owing. The reports of their progress, too, are as full and explicit as could be desired.

Besides these cases, we may mention four others, in which a dropsical ovary has been extirpated with success. These operations were performed by Mr. Southam, Dr. Clay, Dr. F. Bird, and Mr. Lane. The particulars of the first three of these cases are in print;* a brief history of the last has been obligingly communicated to us by Mr. Lane. He tapped the ovarian cyst ten days before its removal; and was thus enabled to extract it through an incision reaching only from the umbilicus to the pubes, instead of from the sternum to the pubes, as in other cases in which the large section has been adopted. At the end of three weeks the ligature round the pedicle of the tumour came away; and Mr. Lane then considered the patient out of danger. Dr. F. Bird's case cannot with strict propriety be classed among those treated by the large operation; his mode of operating much more closely resembling that practised by Mr. Jeaffreson and Mr. Phillips, since he punctured the tumour, and after its contents had escaped, drew it through a small opening in the abdominal walls. The incision, however, was four inches long instead of an inch and a half, and differs in this more extensive wound of the peritoneal cavity from the minor operation, strictly so called.

Since the publication of his pamphlet, Mr. Walne has met with some unsuccessful cases, the particulars of which he will doubtless soon publish. In one of these cases, the operation was, we believe, left incomplete, but the person recovered; in another, the ovary was removed, but the patient died from the effects of the operation. Fatal cases have also occurred to Mr. A. Key,† to Mr. Greenhow,‡ and to Mr. B. Cooper.§

* Dr. F. Bird, in the Medical Gazette, Aug. 1843; Dr. Clay, in the Medical Times, Oct. 7, 1843; Mr. Southam, in the Medical Gazette, Nov. 17 and 24, 1843.

† Guy's Hospital Reports, Oct. 1843.

‡ Announced to be read at the Medico-Chirurgical Society

§ Mr. Cooper's case is likewise to be laid before the Medico-Chirurgical Society: but he kindly replied to some queries addressed to him by the editor. His answers enable us to

We therefore present the following summary, as being, to the best of our knowledge, a correct statement of the results of the large abdominal section.*

It has been attempted 37 times.

It has been actually performed 28 times; in 18 of these cases the patients recovered from the operation, in 10 they died: or deaths were to recoveries in a rather higher proportion than 1 to 2.

Of the remaining 9 cases, in which the operation was left incomplete, either because the tumours could not be removed, or because no tumour existed, 3 terminated fatally; in the other 6 the patients recovered.

We doubt much, indeed, whether the real results of this operation would present data so favorable as those we have just mentioned. We may feel pretty certain that we hear of all the cases in which this or any other unusually bold or bloody operation succeeds; but the confession of errors and failures, whose detail may promote the cause of truth but can never advance self-interest, requires a measure of moral courage to which, unfortunately, all are not equal. Nothing illustrates more strikingly the difference between the real and the apparent results of an operation, than the history of the Cæsarean section. Kayser, in his valuable dissertation, 'De eventu Sectionis Cæsareæ,' mentions that out of 341 cases on record, the recoveries are 127, or 37 per cent.; or nearly 2 recoveries in every 5 cases. If, however, we take the results afforded by the reports of lying-in-hospitals, in which concealment is impossible, and failure is necessarily as notorious as success, we find that of 67 cases only 14 recovered; or that recoveries were only 20 instead of 37 per cent., or 2 in every 10 cases instead of 2 in every 5. Yet it may be fairly assumed, that in these institutions patients would be more ably treated than elsewhere; that the best obstetric and surgical aid would be at hand, the most opportune time for the operation would be chosen, and the most appropriate subsequent treatment adopted. Everything would, therefore, lead us to expect that the results afforded by public institutions would greatly exceed all others in success; and we can account for the reverse being the case, only on the supposition that an immense number of the fatal cases of Cæsarean section which occur in private are never reported.

But even if we assume our present data to be correct, and that they do not at all overrate the success of ovariotomy, it may be fairly asked—Is an operation which is followed by the death of more than 1 in 3 of those in whom it is completed, a fit subject for boasting of as a triumph of art, as constituting an era in the annals of surgery? Is human life

state that the person was thirty-two years of age; that the tumour removed weighed 32lbs. 4 oz.; and that the patient died of peritoneal inflammation, eight days after the operation.

* Mr. Walne's second case was not included in the statistical table in our last Number, because its particulars were not published at the time of the article going to press, and the details with which he kindly furnished the editor, and which we appended as a note at the end, were not sufficient to enable us to submit the case to the same sort of analysis as all the other cases in our tables were subjected to. We retain Dr. Clay's fatal cases where we placed them formerly, for the reasons stated at p. 392 of our October Number; and shall always regard the difficulty of diagnosis as to the nature, seat, and connexions of tumours supposed to be ovarian, as one of the grand objections to the operation. We are aware that these tables have provoked the spleen of more than one gentleman who thought that he had found a ready mode of carving his way to notoriety: we cannot help it—they are true.

so worthless, as to warrant the repetition of this operation, again and again, till, forsooth, we thus obtain more extended statistics? Mr. Key compares the condition of a patient labouring under ovarian dropsy with that of one suffering from stone, and suggests that the arguments for lithotomy in the one are analogous to those which justify ovariotomy in the other. We cannot admit the exactness of this analogy, seeing that in many cases of ovarian disease life is not very materially shortened, and, in a still larger proportion, is not rendered by any means intolerable; while the reverse of both these conditions notoriously exists in the calculous cases usually submitted to operation. But, if the analogy be granted, does it follow, because we practise an operation which is fatal to 1 in 7 * of those who submit to it, in order to relieve a patient from the stone, that we are therefore justified in performing an operation fatal to 1 in 3, in order to remove a diseased ovary? Besides, in lithotomy it is a thing almost unheard of, for the operation to be performed and no stone to be found in the bladder, or for its extraction to be impracticable; but in nearly 1 in 4 of the instances in which ovariotomy has been attempted, an analogous result has occurred. The difficulties attending the performance of lithotomy are so serious as to deter self-sufficient ignorance from attempting it; but, as Mr. Key says, in words very similar to our own, in the October number of this Review, and which stirred the bile of more than one of the doughty champions of ovariotomy: "The operation is of so simple a kind, requiring so little knowledge of anatomy, and so little skilful surgical manipulation, compared with what the other larger operations in surgery call for, that I need not dwell minutely on the steps of its performance;" or, as we should say, that there is imminent hazard of many women being destroyed, and the fair fame of the profession tarnished, by the recklessness of some whose heads are turned by a little notoriety, or even by the hope of attaining it; and who begin incontinently to dream of themselves as Hunters, Harveys, and Hallers.

Let us not be misunderstood: far be it from us to censure indiscriminately. We know that such men as Messrs. Key, Cooper, Lane, &c., can be influenced by no unworthy motives in performing such an operation; and we believe the best men may not only be justified but almost forced to perform this one, under peculiar circumstances. In reference to his own case, Mr. Key, after weighing the reasons for and against its performance, says: "Nevertheless, I thought it my duty to perform the operation;—a duty which every surgeon must occasionally feel to be a painful part of his profession, but from which a lower feeling must not induce him to shrink." Unfortunately, however, all have not treated this subject in the modest, self-forgetting, truth-loving spirit which becomes members of our noble profession.

We have endeavoured to show the results which have hitherto attended this operation, and have always stated the truth and the whole truth as nearly as we could arrive at it. We think that the often-repeated performance of this operation, while comparatively so little has been done towards facilitating our diagnosis of ovarian and uterine tumours, and while at the commencement of the operation it is a matter so very uncertain

* This estimate of the amount of mortality from lithotomy rather overstates than understates the fatality of the operation, as will be seen by reference to the very elaborate and valuable tables in Chapter III of Dr. Willis's work, 'On the Treatment of Stone in the Bladder.'

whether its completion will be practicable, is mere crass empiricism, wholly unworthy of the medical art. Each day, too, brings some fresh confirmation of our opinion; and in the Medical Gazette, for Dec. 9, 1843, the reader will find the particulars of a case that would justify language far stronger than we have ever used. A woman in ill health, and suffering from profuse periodical discharge from the uterus, was received into the Manchester Union hospital for the cure of an abdominal tumour. Mr. Heath and his colleagues, after repeated and careful examination, decided that the tumour was ovarian, and considered that the patient presented "a fair case for extirpation by the abdominal section." The abdomen was laid open by an incision, reaching from the ensiform cartilage to within an inch and a half of the symphysis pubis, when it was discovered that the uterus and not the ovary was the organ diseased. Mr. Heath, however, proceeded to remove it, and actually extirpated the entire uterus, except the cervix and about two inches of the body! The mass altogether weighed six pounds. The patient survived 17 hours after the performance of the operation. Respect for the manly honesty which Mr. Heath has shown in the early publication of this case, induces us to abstain from commenting on it; but indeed it comments on itself. We will only add, that we doubt much whether Mr. Heath would have ever had the hardihood to attempt the operation, still less would he have ventured to complete it as he did, if he had not been misled by the exaggerated and incorrect accounts that have been laid before the profession of the results of extirpation of the ovaria. And here we feel it our duty to animadvert, in the strongest terms, on the backwardness of those who, having so speedily published their successful cases, delay to publish their unsuccessful ones. We are unwilling to impute improper motives to these gentlemen; they may have good reasons for their silence of which we are ignorant; but the reasons must be strong indeed to justify a proceeding fraught with such momentous consequences to the profession, and to society at large.

We think, then, that a much more attentive investigation of ovarian disease and its treatment than has ever yet been made, is necessary, before we shall be able to predicate of certain cases that they are incurable by other means,—that this operation affords a reasonable prospect of their cure,—and that no modification of it will attain the same end. Till we can do this with tolerable certainty, the operation appears to us to be an unwarrantable proceeding. This opinion of ours may be wrong; we hold it simply because we have been led to it by a careful study of the subject, and will gladly retract it so soon as we find that we have been mistaken. In the meanwhile we would remind some gentlemen who seem to have forgotten it, that it is quite possible to arrive at conclusions different from their own, without the decision having been biassed by prejudice, or prompted by party-feeling. There is such a thing, sceptical though some may be with regard to its existence, as a sincere love of truth for its own sake; and we venture to express the belief that it always has been and always will be the characteristic of this Review.*

* Since this article was printed, the account of a second successful case by Dr. F. Bird has been published. The operation was of the intermediate kind, the length of the incision being rather less than six inches. At the date of the last report, (17th day from the operation,) the patient was convalescent. See 'Medical Times,' December 16.

PART SECOND.

Bibliographical Notices.

Art. I.—*Animal Physiology. (From the Popular Cyclopædia of Natural Science.)* By W. B. Carpenter, m.d. &c.—*London*, 1843. 8vo, pp. 580.

This work, which forms part of the 'Popular Cyclopædia of Natural Science,' like all the writings of the author, affords a clear exposition of the subject of which it treats, and is well calculated to render the general reader familiar with some of the most abstruse, but most important, subjects of physiology. It is written in a familiar and exceedingly clear style, and is, we think, calculated to convey most valuable information not only to the general reader but also to the medical student. The plan of combining natural history with physiology is the only way in which this latter subject can ever be made popular. To illustrate abstruse questions by the familiar example of some interesting and constantly occurring facts in natural history, not only tends to lighten scientific details, but puts the facts themselves in a new position, and gives additional force to them. This has been managed by Dr. Carpenter in the present volume in a very admirable and pleasing manner. We may point to some of the chapters in proof of our remark. Take for instance the chapter on the Circulatory System. The whole of this subject is well worked-out up to the period when this part of the 'Cyclopædia' was published. We do not hesitate to affirm that while this will afford a vast deal of information to the general reader, it will convey much new information not merely to medical students but to medical practitioners generally. So again, in regard to the Functions of the Nervous System. This chapter gives a more precise and definite notion of the functions of this part of the body than any book we have yet met with. Again, the chapter on Reproduction and Development will convey an excellent idea of these great functions, without obliging the reader to wade through details that would often tend to fatigue, and perhaps to create some displeasure with the subject in the minds of non-professional readers, for whom these volumes have been expressly written. But, in truth, the whole work is of that genuine masterly stamp which characterizes all the productions of this writer, even those, such as we believe this to be, which are the fruits of his leisure hours, and are not intended for the learned. It is certainly without parallel among the treatises on subjects of natural science hitherto presented to the public, and may be confidently recommended to readers of every class, as fraught with important information not elsewhere to be found in so agreeable a form.

Art. II.—*Some Observations on the Mental State of the Blind and Deaf and Dumb; suggested by the case of Jane Sullivan, both blind, deaf, dumb, and uneducated.* By R. Fowler, m.d. f.r.s.—*Salisbury*, 1843. 12mo, pp. 64.

This little pamphlet is well worth the perusal of those who feel an interest in the remarkable class of cases of which it treats; and as the public mind has been lately much directed towards the American girl, Laura Bridgeman, whose remarkable progress has been due to the untiring exertions and intelligent guidance of Dr. Howe, the notices collected by Dr. Fowler, of several cases presenting the same deficiency, but in which no attempt at education had been made, are additionally valuable, for the sake of comparison. He considers that, from observations made upon such cases, important inferences may be drawn, in regard to the *muscular sense*, to which he attributes that preparation or adjustment of the organs of special sense for the ready reception of impressions, which takes place when the *attention* is directed to the sensations they convey.

Art. III.—*General Therapeutics and Materia Medica, adapted for a Medical Text-book.* By Robley Dunglison, m.d., Professor of Institutes of Medicine in Jefferson Medical College, Philadelphia, &c. —*Philadelphia*, 1843. Two Vols. 8vo, pp. 988.

The works of Dr. Dunglison are of a very uniform character. They are those of a well-informed, industrious, and judicious professor of medicine, who aptly perceives the kind of books that are wanted within the sphere of his own activity, and who is well qualified to supply the desiderata. We by no means intend to insinuate, however, that Dr. Dunglison's works are not calculated to be everywhere useful. The volumes before us consist of a republication of the author's work on 'General Therapeutics,' with a new treatise on 'Materia Medica.' Only seven years having elapsed since the first appearance of the former, little addition or alteration has been required; for changes in our views of general therapeutics come round but slowly, while every month brings forth some novelty in the specialities of the healing art. The subject of materia medica has been handled by our author with more than usual judgment. The greater part of treatises on that subject are, in effect, expositions of the natural and chemical history of the substances used in medicine, with very brief notices of their medicinal virtues, and scarcely any notice at all of the relations which obtain between the special indications they are capable of fulfilling, and the general principles of therapeutics. In short, such books are adapted merely for the apothecary. Dr. Dunglison, very wisely in our opinion, has reversed all this, and given his principal attention to the articles of the materia medica as *medicines*. Nevertheless he has, in all instances, "referred to the position held by the drug as an article of the organized or of the inorganic kingdom, as well as to general matters of interest relative to the place where it is found; the manner in which it is obtained; and to certain points connected with its commercial history; but next to therapeutical applications, he has dwelt more at length on the sensible properties by which the physician may be enabled to judge of the various articles from his own observation." (Preface.)

Dr. Dunglison has succeeded very happily in connecting general with special therapeutics. His work is cast in a somewhat similar mould with that of Dr. A. T. Thomson on the same subjects. If the latter have, perhaps, the advantage in plenitude of materials, the former is more lucid in its arrangement and simpler in its expositions; but as the materia medica of the one is conformed to the British Pharmacopœias, and of the other to that of the United States, there is ample room for them both. Dr. Dunglison has modified the classification of therapeutical agents, adopted in his 'General Therapeutics,' when first published. It now stands as follows:

1. Agents that affect prominently the alimentary canal or its contents	Emetics. Cathartics. Anthelmintics.
2. Agents that affect prominently the respiratory organs .	Expectorants.
3. Agents that affect prominently the follicular or glandular organs	Errhines. Sialogogues. Diuretics. Antilithics. Diaphoretics.
4. Agents that affect prominently the nervous system .	Narcotics. Tetanics. Antispasmodics.
5. Agents that affect prominently the organs of reproduction .	Emmenagogues. Parturients.
6. Agents that affect various organs . . .	Excitants. Tonics. Astringents. Sedatives. Refrigerants. Revellents. Eutrophics.
7. Agents whose action is prominently chemical . .	Antacids. Antalkalies. Disinfectants.
8. Agents whose action is prominently mechanical . .	Demulcents. Diluents.

We do not attach much importance to arrangements of this nature, which, in the present state of our knowledge, cannot even approximate to accuracy. All successful attempts at classification must be based on the recognition of certain distinctive and invariable characters in the objects classified: how little this is the case with respect to therapeutic agents, it would be superfluous to demonstrate. Dr. Dunglison has here introduced two new terms. To one of these we decidedly object, namely, *parturients*, the use of which would imply that the therapeutic agents themselves were about to bring forth infant remedies. It would not be easy to find an appropriate name for such agents, for the Greek language, as far as we know, contains no verb signifying "to cause to bring forth," nor does it afford any combination which would aptly designate the agents in question, unless, indeed, it be *tocogogues*, from *τοκος partus*, and *αγω duco;* we believe, after all, that worse terms have passed current. The other term to which we allude is *eutrophics*, (promoters of healthy nutrition,) which Dr. Dunglison has substituted, judiciously we think, for "alteratives," a term conveying no distinct meaning.

In conclusion, we strongly recommend these volumes to our readers. No medical student, on either side of the Atlantic, ought to be without them.

Art. IV.—*Elementary Instruction in Chemical Analysis.* By Dr. C. Remigius Fresenius, Chemical Assistant in the Laboratory of the University of Giessen. Translated by J. Lloyd Bullock, Member of the Chemical Society, &c.—*London*, 1843. 8vo, pp. 284.

It must be well known to our readers that the Giessen Laboratory is now the resort of students in chemical science, from all countries; on account both of the high reputation of the illustrious philosopher by whom it is superintended, and of the admirable arrangements of the school itself. And as its pupils are for the most part men who are not content with a smattering of knowledge but who enter upon their course of study in good earnest, with the view of qualifying themselves for the successful prosecution of the science in after life; it is obvious that no ordinary opportunities of ascertaining the best plan of instruction, must be enjoyed by those who have the direction of the practical course. As Dr. Fresenius well remarks, "Many ways may lead to the desired end; but one of them will invariably prove the shortest." Along that which his experience has proved to be the shortest cut, although very far from being a *royal road*, Dr. Fresenius endeavours to lead the student, by means of this treatise, which has already gone through two editions in Germany, and which has received the following *imprimatur* from Professor Liebig:

"Dr. Fresenius conducts the course of elementary instruction, in mineral analysis, in the laboratory of the university of Giessen. During the two last sessions he has followed the method described in his work, entitled 'Elementary Instruction in Qualitative Chemical Analysis' This method I can confidently recommend from my own personal experience, to all who are desirous of obtaining instruction in inorganic analysis, for its simplicity, usefulness, and the facility with which it may be apprehended. I consider Dr. Fresenius' work extremely useful as an introduction to Professor H. Rose's excellent Manual, and for adoption in institutions where practical chemistry is taught, but it is especially adapted to the use of pharmaceutical chemists. Further, a number of experiments and discoveries have been recently made in our laboratory, which have enabled Dr. Fresenius to give many new and simplified methods of separating substances, which will render his work equally welcome to those who are already familiar with the larger works on inorganic analysis." (Preface.)

A treatise of this kind is obviously not adapted for notice in detail; but we shall give an extract from the editor's preface, which will indicate the leading features of the work, and especially the points on which it chiefly differs, as regards its plan, from that of Mr. Parnell, to which we directed the attention of our readers not long since.

"The author was led to compose this volume upon perceiving that the larger works on chemical analysis, such as H. Rose's, Duflos', and others, although admirable in themselves, present great difficulties to beginners, which difficulties may be summed up under three heads; 1st, Too great copiouness and detail; 2d, the absence of explanations of the causes of phenomena, i. e. the *theory* of the operations and reactions; and, 3d, the omission altogether of many substances of very frequent occurrence, especially in the operations of the pharmaceutist, such as the organic acids, &c. In avoiding these objections to former works on chemical analysis, Dr. Fresenius, I think, is not chargeable with having fallen into the opposite extreme of being too concise or elementary.

"The student may perhaps at first be disappointed in taking up this work to find that there are no tables constructed to furnish him at a glance with all he is desirous to know of tests and reactions, and to save him, as he may think,

trouble and time. But this has not arisen from oversight; the question of the advantage or disadvantage of tables to the students has been fully considered; and the author has decided,—and the decision is borne out by the highest authorities,—that such tables serve no really good purpose; they rather, on the contrary, supply but very superficial information, and satisfy the student before they have really informed him. The information contained in this work, like every other professing to teach a practical science, requires application and perseverance to attain; but if begun at the beginning, if the student will carefully go over the necessary preliminary facts, the examination of his tests, and the reaction of the simple bodies consecutively, and make himself master of this very simple and elementary part of the course, he will find no difficulties when entering upon the more elaborate, and—what might appear without this preparation—complex and intricate processes of the second part, the analysis of compound bodies. It is altogether another question whether the student should or should not exercise himself and his memory, by tabulating the results of his experiments as he proceeds; and to this question we reply in the affirmative; but it must be left to individuals to act in this according to their own judgments, and their own feeling of its necessity." (Preface, pp. 6, 7.)

Mr. Bullock appears to us to have executed his task as translator and editor, in a very creditable manner; so that the work altogether wears quite an English garb. We would, however, ask him why he has omitted the word "qualitative" from the original designation of the treatise? The title, as it now stands, is very liable to mislead others, as it has ourselves; since the book will undoubtedly be ordered by many, who expect that a treatise emanating from the school of Giessen, shall include *organic* as well as inorganic analysis. With the exception of the organic acids, the substances examined in this volume belong altogether to the mineral kingdom.

Art. V.—*On Man's Power over himself to prevent or control Insanity.* By the Rev. John Barlow, M.A. F.R.S. &c., Secretary of the Royal Institution of Great Britain.—*London*, 1843. 18mo, pp. 68.

This little essay, like the former one from the same pen which we noticed with approbation a few months since, contains the substance of a communication made to the members of the Royal Institution at one of their Friday evening meetings. It possesses the same claims to the attention of the general reader, in the truthfulness, simplicity, and at the same time the comprehensiveness of its views; although the intelligent medical reader may probably not find anything in it, with which he is not already familiar. Mr. Barlow's object is to prove that, in a large proportion of cases, insanity may be traced to the faulty indulgence of some propensity or feeling, which the due exercise of self-control would have restrained; and he justly appeals, in support of this position, to the valuable effects resulting from the application of this principle to the treatment of insanity—the best restraint under which lunatics can be kept being that of *their own* self-control, if motives can be found of sufficient strength to cause them to exert it.

The views entertained, and the principles elucidated in this little work, have indeed a wide and important range. They call the attention to that greatest of all sciences which teaches us to govern and to strengthen the highest of our faculties for the most valuable ends, and to make the intellect the great auxiliary of virtue. It is gratifying to find an accomplished clergyman addressing a highly-cultivated audience on these topics;

worthy of those addressed, however distinguished in philosophy,—and worthy of a divine, who should know how to address himself to minds of the highest as well as of the humblest attainments. From the pages of Mr. Barlow's essay powerful arguments may be gathered for the promotion of education, and of all other means of preventing criminal excesses, and warding off impulses that by repetition become morbid and incontrollable; and in these days of rapid movement, vast speculation, and growing avarice and ambition, there are many readers in many classes of society to whom a medical practitioner may recommend such reading as remedial against restless cares which "not poppy, nor mandragora, nor all the drowsy syrups in the world" can cure.

ART. VI.—*Remarks on Schools of Instruction for Military and Naval Surgeons, in a Letter to Sir Robert Peel.* By SIR GEORGE BALLINGHALL, M.D., Regius Professor of Military Surgery in the University of Edinburgh. 8vo, pp. 16.

THE praiseworthy object of this Letter is to point out the importance of having a professorship of military surgery in London and Dublin as well as in Edinburgh. Sir George's motives in making this proposal are singularly disinterested, and he argues his case zealously and well. We cannot help entertaining doubts, however, whether the institution of the chairs in question is necessary. The arguments derived from their existence and utility in the continental states, appear to us less valid than to Sir George. The extremely low state of the full-pay and half-pay of the medical officers in the continental armies, prevents fully-educated men from entering them, and interferes with the prosecution of study in the intervals of active service. The opposite state of things exists in this country. We willingly admit, however, that the military chair at Edinburgh has been very useful, especially since filled by Sir George; and it would give us pleasure to see his wishes fulfilled, and men of equal talents with himself appointed to instruct their junior brethren when on half-pay, in the other capital cities of the kingdom.

ART. VII.—*The Electro-physiology of Man. With practical illustrations of new and efficient modes of Galvanic Treatment in a variety of cases.* By JOHN DODDRIDGE HUMPHREYS, Esq.—*London*, 1843. 12mo, pp. 228.

A MERE puff, designed to inform the public, that John Doddridge Humphreys, Esquire, practices medical galvanism in a new and superior style; curing patient after patient whose maladies have resisted all ordinary modes of treatment, and applying the most efficient remedies to almost all the diseases that flesh is heir to. As a scientific production it is totally valueless. The author's whole theory of the operation of electricity on the animal body is founded upon Dr. Wilson Philip's well-known experiments; the public faith in which, as identifying nervous agency with electricity, does not seem to be in the least shaken by the disproof with which this doctrine has been met by other experimentalists. We are far from discouraging the judicious application of electricity as a remedial means: since we regard it as a very important therapeutic agent, the true value of which has not yet been fairly tested. But as-

suredly our confidence in it will not be increased by any of the reports of John Doddridge Humphreys, Esquire, or of any other professed electrician; since we all know how much those who restrict themselves to any one particular plan of treatment, become prejudiced, even when their intentions are of the best possible character, in favour of its use. But we hope that our other great hospitals will follow the example of Guy's, and will add an electrical apparatus to their *armamentarium therapeuticum*, placing it under the most competent director who can be secured, and giving to the public an unbiassed report of the results of its application.

The true nature of Mr. Humphreys's book is shown by the fact, that he only indicates in the vaguest possible terms, in what his "new and efficient modes of galvanic treatment" consist; so that no one has the power of repeating his experiments, and of giving a more trustworthy account of their value.

Art. VIII.—*A Pathological and Philosophical Essay on Hereditary Diseases. With an Appendix on Intermarriage, and on the Inheritance of the Tendency to Moral Depravities and Crimes.* By J. H. Steinau, m.d., of the Royal Medical College, Berlin.—*London*, 1843. 8vo, pp. 52.

This *brochure* may be regarded as a second edition of an essay which was published some years since in Germany; where, the author informs us, it met with a very favorable reception. It contains a good summary of the recorded opinions and experience of a large number of celebrated physicians, and some interesting observations made by Dr. Steinau himself; but we do not find anything very original in his mode of viewing the subject. As a lucid compendium of the present state of our knowledge, however, it may be read with advantage. We do not venture to anticipate that *any* improvements in physiological knowledge will ever teach us how the influence of the *male* parent is exerted upon the germ, so as to impress on it the tendency to repeat, in its own body when fully developed, and in the germ of a succeeding generation, certain peculiar disordered actions; any more than we expect to be able to find out why a particular feature or other peculiarity of his own is repeated in his offspring: or, to take a more general case, state why the first embryonic cell, which *seems* to be alike in all animals, should develop itself into the form of the genus Homo, rather than into any other. These are mysteries which we cannot solve in our present state of existence; and we can only account for them by regarding them as instances of a general law. The influence of the female parent, upon whom depend the nutrition and support of the germ from its earliest introduction into the ovum, up to the time when it can maintain itself, is more easily accounted for; and knowing what a remarkable effect the state of the mind has upon the processes of nutrition and secretion in the parent, we can scarcely wonder at any result which manifests itself in the offspring. We think that the subject of hereditary disease would be best considered as a branch of the more general inquiry into hereditary propagation of corporeal forms and mental characters in general; and we would suggest to Dr. Steinau the prosecution of his inquiries (a continuance of which he leads us to expect, if time and opportunity be afforded to him,) on this more extended basis, the importance of which, from various intimations in his present essay, we are sure that he fully appreciates.

ART. IX.—*Manual of British Botany, containing the Flowering Plants and Ferns, arranged according to the Natural Orders.* By CHARLES C. BABINGTON, M.A. F.L.S. F.G.S. &c.—*London*, 1843. 12mo, pp. 400.

WE cannot better set before our readers the peculiar characters of this admirable little volume, than by quoting from the preface the author's own account of the motives for its production:

"From the attention which has long been paid to the elucidation of the Flora of Britain, and the numerous excellent botanists who have, since the time of the justly celebrated Ray, (not to go further back,) employed their talents upon an endeavour to determine the indigenous products of these kingdoms; the author, in common, it is believed, with most English botanists, did not suppose that much remained to be done in British botany; for he could not expect that, after the labours of such men as Smith, Hooker, Lindley, and others, and the publication of so invaluable and unrivalled a collection of figures as is contained in the English botany, there could still be many questions concerning the nomenclature, or any considerable number of unascertained species, the determination of which would fall to his lot. He had not however advanced far in the critical examination of our native plants, before he found that a careful comparison of indigenous specimens with the works of eminent continental authors, and with plants obtained from other parts of Europe, must necessarily be made; for it appeared, that in very many cases, the nomenclature employed in England was different from that used in other countries, that often plants considered as varieties were held to be distinct species abroad, that several of our species were only looked upon as varieties by them, and also that the mode of grouping into genera was frequently essentially different." (Preface, p. 5.)

Mr. Babington then traces these discrepancies to their true source—the *exclusive system*, which, arising in some degree from our insular position, has been cherished, during the early part of the present century, by the separation induced by the continual state of warfare between Britain and the continent; and which has prolonged the attachment to the Linnæan system, and the valuable, but frequently erroneous works founded upon it, to the almost total neglect of the works of continental authors, who, it must be remembered, have under their observation a very large proportion of the plants found in this country, and who have frequently great advantages over British botanists in studying the influence of circumstances in producing variations. In the preparation of the present work, the author states, with his characteristic modesty, that

"He has carefully examined nearly all the best European floras, comparing our plants with the descriptions contained in them, and in very many cases with foreign specimens of undoubted authenticity. In the adoption of genera and species, an endeavour has been made, by the examination of the plants themselves, to determine what are to be considered as truly distinct; thus, it is hoped, taking nature as a guide, and not depending upon the authority of any name, however distinguished. Still, let it not be supposed that any claim is made to peculiar accuracy, nor that the author considers himself qualified to dictate to any student of botany; for he is well aware that there are many points, upon which persons who have carefully studied the subject, may form different conclusions from those to which he has been led." (Preface, p. vii.)

To the faithful execution of this purpose, Mr. Babington's well-known character as a scientific botanist, is a sufficient guarantee; and in regard to the typographical beauty and accuracy of the work, it is enough to say, that it is published by Mr. Van Voorst, and is worthy of his reputation.

PART THIRD.

Original Reports and Memoirs.

REPORT ON THE PROGRESS OF ANATOMY AND PHYSIOLOGY IN THE YEAR 1842-3.

By James Paget,
Lecturer on General and Morbid Anatomy and Physiology, and Warden of the Collegiate Establishment, at St. Bartholomew's Hospital.

The general rule followed in this Report is that those works alone are noticed which were published between the first day of October, 1842, and the last of September, 1843. The author does not pretend to give an account of more than those new things which have, in his opinion, been proved or rendered probable in the period and in the department which the report embraces; nor is it pretended, after all the labour that has been bestowed upon it, that the account of these things is absolutely complete. Some works of importance have probably been inaccessible, others may have been overlooked or wrongly estimated; and therefore all those who find herein no notice of their recent physiological labours, have liberty to believe that the omission is the author's fault, not their's.

The arrangement of the subjects which the author has adopted is that of his own lectures; it is the one most convenient to himself, and probably will suit the purposes of as many readers as any other would.

BLOOD.

Concerning the *general constitution* of the blood, MM. Andral and Gavarret, continuing with M. Delafond the observations already made on human blood, have examined that of many domestic animals, and have drawn these conclusions:* 1. In the species examined, the principal constituents of the blood are the same, but the proportions of each vary. 2. The highest natural average quantity of fibrin is in the herbivora, the lowest in the carnivora: the energy of constitution has no constant influence on the increase of the proportion of fibrin. 3. Of the corpuscles the highest average proportions are found in the carnivora, the lowest in the herbivora; and in the same species there is always an increase proportionate to the energy of the constitution; and in sheep, to the improvement of the breed. 4. During the first day after birth the fibrin is in very small quantity; the corpuscles comparatively abundant. 5. During the last periods of gestation, both fibrin and corpuscles fall below the healthy proportion; after parturition they increase to more than that proportion. 6. The fibrin (in the domestic animals as well as in man) is always increased in the inflammatory state: the corpuscles are never directly influenced in it. 7. The water of the blood has its lowest average in the carnivora, its highest in the herbivora. 8. Dropsy does not supervene on alteration of the blood, unless from diminution of albumen; excess of water or decrease of corpuscles will not produce it.

Coagulation. Dr. Polli,† from a long series of experiments on the influence of various gases on the coagulation of the blood, has shown how the discrepancy of previous experiments has depended on inattention to their details. All other con-

* Annales de Chimie et de Physique, 1842.
† Gazzetta Medica di Milano, Aprile 15, 1843.

ditions being the same, important differences as to time and mode of coagulation result from temporary exposure of the blood to the air, or from air remaining in the vessel, &c. Avoiding all these sources of fallacy, he found that coagulation takes place in pure oxygen or nitrogen, just as in atmospheric air; but that the presence of carbonic acid always impedes coagulation. Carbonic acid is always given off in coagulation; and the greater the freedom with which it can be evolved, the more are the circumstances favorable to coagulation. The more carbonic acid the blood itself contains the slower is the coagulation, and the greater the chance of a buffy coat being formed; and a buffy coat being formed, without froth and over a dark clot, is always a sign of the blood being surcharged with carbonic acid.

Buffy coat. The exact mode of the formation of the buffy coat has been well illustrated by Mr. Wharton Jones,* whose observations on the blood I can in nearly all points confirm. He ascribes it, as Nasse and others did, chiefly to the tendency of the blood-corpuscles to arrange themselves rapidly in rolls (like rolls of coins,) which form a wide-meshed network, (as seen in a single layer under the microscope,) or a kind of spongework when they are kept in mass. In the former case the liquor sanguinis coagulates within the meshes of the rows of the corpuscles, and hence the distinctly mottled aspect of the layer when coagulated as well as when first drawn; in the latter case the spongework formed by the rows of corpuscles contracts and squeezes out the liquor sanguinis, and permits the greater specific gravity of the corpuscles to come into play, so that they sink quickly and the liquor sanguinis floats to the top and coagulates in a distinct layer. In both cases the pale corpuscles remain with the separated liquor sanguinis and are imbedded in its white coagulum.† The attraction for each other by which the corpuscles tend to unite in rolls, is so remarkably increased in the state of the blood in which a buffy coat is formed, that the early or instantaneous occurrence of this arrangement of them, as seen by the microscope in a single drop of blood, affords all the evidence which could be derived from the formation of a buffy coat on a large quantity.

Corpuscles. On the size of the blood-corpuscles, Mr. Gulliver has added to his former copious observations the measurements of those of many more species of mammalia and birds;‡ and on their structure he has adduced,§ from a comparison of the effects of water, acetic and muriatic acids, and other agents upon the blood-corpuscles of mammalia and birds, further evidence for the belief that those of the former do not contain nuclei; or, rather, that although their central may differ from their peripheral matter, the former does not stand in the relation of a nucleus to the latter, except in the blood-corpuscles of embryos. A chief point in the evidence is, that in the corpuscles of birds, small as they are, a nucleus may be demonstrated; and so plainly, that if such an one existed in the mammal's corpuscle, it could not escape notice when similarly searched for. Mr. Wharton Jones‖ also denies the existence of the nucleus in these corpuscles; and shows that the particles which are supposed to be nuclei exposed by the action of acetic acid on the corpuscles of mammalia, are only portions of albumen coagulated by the acid, such as may be produced by adding acid to liquor sanguinis or serum. At the same time it is not to be supposed that the corpuscle is homogeneous throughout; the central substance is evidently different from the peripheral, and Mr. Jones's opinion seems very probable, that the appearance of a nucleus depends on the walls of the corpuscle being thick, consisting of two layers,

* British and Foreign Medical Review, October, 1842, and Edinburgh Medical and Surgical Journal, October, 1843.

† The tendency of the pale corpuscles to keep with the liquor sanguinis is also shown by Mr. Gulliver, in his observations that fibrin obtained by washing, even when transparent and quite colourless, contains these corpuscles in great numbers. (Lond. and Edinb. Phil. Mag., Aug. 1842.) I have found that films of liquor sanguinis which has coagulated on healthy blood drawn under oil, are composed entirely of pale corpuscles held together like the cells of a tesselated epithelium.

‡ Proceedings of the Zoological Society, Dec., 1842.

§ London and Edinburgh Philosophical Magazine, August, 1842.

‖ *L. c.*

the outer transparent, colourless, and resisting; the inner softer and less resisting. Between the two, or perhaps in the inner layer, the colouring matter is contained. The existence of a true nucleus in the corpuscles of the lower vertebrata is not by this rendered doubtful; and Mr. Addison* has shown, in the use of *liquor potassæ*, a good method of demonstrating it in the corpuscles of the frog.

Many interesting observations have been made by both Mr. Wharton Jones and Dr. Carpenter, in support of the view that some of the corpuscles of the blood are a kind of "floating gland-cells."† The former believes that the office of the red corpuscles is to convert albumen into fibrin, elaborating it in their interior, and then, after the manner of gland-cells, dissolving and discharging their contents. The latter thinks it more probable that this office of converting the chemical compound into the organizable principle, is discharged by the pale corpuscles, and that the red corpuscles are the chief carriers of oxygen and carbonic acid. The arguments of each may be found in the last October and January numbers of this Journal. Whichever view be most true, it may be received as highly probable, that the corpuscles in the blood are the agents by which, with the aid of the oxygen imbibed in the lungs, the liquid portion is brought into a state fit for the nutrition of the tissues, and that this is their chief purpose.

Mr. Macleod‡ has described the development of the blood-corpuscles in the chick, dividing it into three stages. At first there are no particles in the blood except minute dark spherical granules. These gradually enlarge and become clear in their centres; but when they have arrived at the double of their origiual size, the central part of each becomes dull and then distinctly granular, while the border becomes defined, smooth, and clear. This completes the first stage, after which, in the second, the central granules disappear as if they had merged into one central clear nucleus, from which the external portion slowly separates, not at one side only, but all round. In this stage the corpuscle remains circular; but it becomes flatter, both on its surfaces and its edges, and a concave furrow forms between its outer border and the border of the nucleus. At the same time also it acquires colour apparently by the accumulation of colouring matter in the space between the nucleus and capsule. In the third stage, the corpuscle assumes the oval shape: first one side of both the cell and the nucleus gradually stretching out, and then the other, so that every part of the corpuscle becomes narrower except the middle. Coincidently with these changes, the furrow around the nucleus disappears, and the sharp edges of the borders are smoothly rounded off.

Mr. Macleod believes that all these changes are effected by a power dwelling in the granules, each of which developes itself into a cell. He has never seen any congregation of granules to form a cell, nor any multiplication of granules within the once-formed nucleus, nor any opening in the centre of the nucleus, nor any escape of corpuscles from it.§

FIBRO-CELLULAR TISSUE.

Dr Todd and Mr. Bowman‖ have thrown doubt on the received opinion concerning the structure of the fibro-cellular tissue. They regard it not as consisting of bundles of parallel filaments of definite size and structure, but as a substance which

* Transactions of the Provincial Medical and Surgical Association, vol. xi, p. 253.

† See Report, Oct. 1842, p. 12.

‡ London and Edinburgh Monthly Journal of Medical Science, Sept. 1842.

§ On the speedy and abundant development of microscopic vegetables (like those formed in fermenting fluids) in serum, or other albuminous fluids which have been neutralized by weak acids, diluted with water, and then exposed to the atmosphere, see MM. Andral and Gavarret's 'Recherches sur le Développement d'un Végétal microsc. dans les Liquides Albumineux,' read at the Acad. des Sciences, Jan. 30, 1843, in the Gazette Médicale, Févr. 11, 1843. There does not appear any ground for supposing that these vegetables (which are what Liebig supposed to be precipitated globules of albumen,) are, as some seem to think, a product of the blood; they are only formed under the same circumstances as other analogous vegetables are in other fluids exposed to the air.

‖ Physiological Anatomy and Physiology of Man, p. 69.

has a tendency to split up almost *ad infinitum* in the longitudinal direction, and which has a filamentous appearance from streaks and creasings on its surface. [In small hard tendons, such as those of insects, this description may hold; they are compact and nearly homogeneous bands, with scarcely any appearance of a filamentous composition; but in the looser varieties of fibro-cellular tissue I cannot doubt the existence of bundles of distinct filaments.]

A few facts concerning the anatomy of tendons may be collected from the long discussions on tenotomy at the Parisian Academy of Medicine.*

MUSCULAR TISSUE.

I have lately found a mode of attachment of the ultimate fibres of muscles to their tendons which has not yet, I think, been made known. It may be distinctly seen in the muscle torn out from the leg of a fly. Each of three tendons, which are planted in the proximal end of the last but one articulation of the leg, runs in a long straight and flat band up the interior of the next superior division of the limb, and receives on each of its edges the broad and somewhat rounded bases of the muscular fibres. These are arranged in a penniform manner, the base of each fibre on one side of the tendon corresponding to the halves of the bases of two adjacent fibres on the opposite side, like the leaflets of the pteris and some other ferns. The fibres are flat, and their extremities, instead of being ensheathed in the tendinous tissue, only adhere to the border of the tendon, and receive on their outer edges one or two finer tendinous filaments, as if for greater fixity.

Dr. Remak† has found that portions of the diaphragm, the heart, and the muscular walls of the larger vessels of many animals of all classes, will continue spontaneously contracting for as many as forty-eight hours after death. He has also pointed out their several modes of contraction, (?) which he distinguishes as creeping, undulating, peristaltic, and serpentine or zig-zag.

Rigor Mortis. An ingenious paper has been published by Ernst Bruecker‡ to prove that the rigor mortis is due to the coagulation of the fibrin which is effused from the blood-vessels in the liquor sanguinis for the nutrition of the tissues, (especially of the muscles,) but which at the time of death has not yet been assimilated. The paper is chiefly important for the numerous analogies which it points out between the coagulation and subsequent changes of the fibrin and the contraction of the muscles; analogies of which Mr. Hunter had already illustrated many, and some of the most important. But the explanation of the rigor mortis is rendered improbable by the observations of Mr. Bowman, which I can fully confirm, and which prove that the muscle is rigid because its fibres, or parts of them, are contracted, and contracted in the same manner as during life. And some examinations which I have made of the rigor mortis in the involuntary muscles, afford equally strong evidence of its being due in them also to the muscular contraction. I believe that *all involuntary muscles* pass into the continued and fixed contraction of the rigor mortis as soon as they cease to be irritable, and to contract under ordinary stimuli. This may be seen distinctly in many arteries, as well as in the digestive canal and urinary bladder; but the best examples are presented in the hearts of recently slain animals, or of men examined soon after apparent death.§ As soon as they cease to be irritable, the walls of all their cavities,

* Bulletin de l'Acad. Roy. de Médecine, Nov. 1842, Gazette Médicale, and other journals of the same date.

† Müller's Archiv, 1843, Heft ii. ‡ Ib. 1842, Heft iii.

§ Hearts in the state of rigor mortis are those commonly described as affected by concentric hypertrophy. Dr. George Budd proved some years ago that this appearance of an increased thickness of the walls with diminution of the cavities could not be due to disease of the heart; (Medico-Chirurg. Trans., vol. xxi, p. 296;) and I may add to the evidence which he adduced, (and which ought to have been taken as decisive of the question,) that in every instance the hearts of healthy oxen become affected with an extreme degree of *concentric hypertrophy* within an hour after they are slaughtered. I have little doubt also that the hearts of all persons pass into a similar state within a few hours after apparent death; certainly a large majority of the hearts examined within the first

previously flaccid, gradually become firm and hard, draw in towards the base of the heart, and reduce or completely close the cavities. The heart thus rigid has almost exactly the form and other external characters of the heart when actively contracted during life. It is evident that this form, produced as it is by a drawing up towards certain fixed points of attachment of the muscular fibres, could not be acquired by the mere coagulation of either blood or liquor sanguinis within the tissue of the heart; and the only difficulty in believing that the rigidity of the heart and other muscles is due to a contraction comparable with that which occurs during more active life, must be from the seeming improbability that any tissue should maintain a vital contraction so long after apparent death as during the continuance of the rigor mortis. This difficulty, however, which would in any circumstances be more apparent than real, is almost removed by the facts already quoted from Remak.

CIRCULATION.

Dr. Marshall Hall,* in a paper on the 'Circulation in the Acardiac Fœtus,' has given proof that the pulsatory movement of the blood may, under certain circumstances, be communicated to the blood in a second set of capillaries. He placed the pectoral fin of an eel in the field of a microscope, and compressed it by the weight of a heavy probe. The movements of the blood in the capillaries became obviously pulsatory, their pulsations being synchronous with the contractions of the ventricle. He adduces this fact in support of the probability that the circulation in the acardiac fœtus is maintained by the force of the heart in the perfect twin fœtus, by which the blood is driven through the capillaries of the placenta into the umbilical vein of the acardiac fœtus, and thence through its venous capillaries into the aorta, and along the umbilical arteries to the placenta again. And the fact is equally important as an additional evidence of the general propagation of the force of the heart through one or even two sets of capillary vessels.

M. Poiseuille's observation of the influence of cold on the capillary circulation is mentioned in the last Report. (p. 44.) He has further shown† that the influence of some other agents is similar in organic and in inorganic capillary tubes. By adding successively acetate of ammonia, nitrate of potash, and alcohol to the blood, he found that the first two accelerated, and the last retarded its flow. They produced the same effects when added to serum which was made to pass through inorganic capillary tubes; as, indeed, might be expected, seeing that in both cases the bulk of the fluid moves, not upon the walls of the tube, but upon the layer of fluid which adheres and remains at rest upon the walls. Applying these results to determine the rate at which blood passes from one jugular vein to the other through the lungs, heart, &c., he found that the passage was made, in horses, in from eighteen to twenty-four seconds, when acetate of ammonia or nitrate of potash was added to the blood, but in from forty to forty-five seconds when alcohol was added.

According to Mr. T. Wharton Jones,‡ the congestion which succeeds to the temporary acceleration of the capillary circulation in an inflamed part, is due to the red blood-corpuscles adhering together (in the manner already described,) and to the walls of the vessels till stagnation occurs; and he has shown that the same arrest of the blood takes place when capillaries are touched with a solution of salt, or when a stream of carbonic acid is directed against those of the frog's lung. From these last facts he suggests with much probability that the stoppage of the circulation in the capillaries when certain salts are added to the blood, and that which takes place in asphyxia, depend on a similar adhesion of the corpuscles. With regard to asphyxia, his observations agree in their tendency with those of

ten hours have more or less the appearance of being contracted, and many retain the appearance for twenty-four or thirty-six hours. In the majority relaxation and flaccidity return after the first day. But the rules as to time by which the rigor mortis is regulated in both the voluntary and the involuntary muscles have yet to be studied.

* Lond. and Edinb. Monthly Journ. of Med. Sc., June, 1843.

† Memoir presented to the Académie des Sciences, Janvier 9, 1843.

‡ Report, &c. Brit. and For. Med. Rev., Oct. 1842.

Dr. John Reid on the stagnation of the blood, independent of any apparent mechanical hindrance, when nitrogen is inhaled; and the action of carbonic acid in making the corpuscles cohere in rolls and assume the most favorable condition for the formation of a buffy coat, gives additional probability to the observations already quoted from Dr. Polli.

RESPIRATION.

Respiratory Movements. MM. Beau and Maissiat,* have published some investigations in the physiology of respiration. Revising the forgotten opinions of Haller and Boerhaave, they have pointed out the very different characters of the respiratory movements in men, women, and children. They distinguish three types of these movements. 1. The *abdominal;* in which the visible movements are entirely in the abdominal walls, and especially in their anterior part, the ribs being unmoved, except when the body rests on the side. 2. The *inferior costal;* in which the movement takes place chiefly in the lower ribs, from the seventh inclusive downwards; those above the seventh moving very little, and the less, the higher they stand; and the lower end of the sternum ascending, though in a less degree than the ribs expand. 3. The *superior costal;* in which the movement is effected chiefly in the upper ribs, (especially the first,) which are carried upwards and outwards, and carry with them the clavicles and sternum.

In infants, and often to the third year of life, the respiration is of the abdominal type in both sexes. After the third year, the superior costal type is generally observed in girls, and the inferior costal in boys; and after puberty, the difference becomes more striking. Nearly all women breathe with the upper half of the chest, and nearly all men with the lower half and the abdomen. The mode of respiration in women has no connexion with their wearing of stays, but is probably adapted to the little capacity for breathing with the lower part of the chest during pregnancy. The difference is maintained, in general, even in dyspnœa; only, when it is extreme, a person whose natural respiration is according to any one of these types, may exhibit combinations of the movements proper to the others.

The quiet respiration of the rabbit and the cat is abdominal; their excited respiration is abdominal and inferior costal; that of the dog is always inferior costal; that of the horse is abdominal, except in sighing or when *blown*, when it becomes inferior costal, like that of man. These animals were used in experiments in which many of the actions of the respiratory muscles were observed.

On the anatomy of the osseous parts of the respiratory organs, the authors point out that the intercostal spaces are always proportionately widest between those ribs which are most moved in respiration; the superior are the wider in women, the inferior in men. In men, too, there is a remarkable distance between the sixth and seventh ribs, and the seventh and three following it often form a great projection. The articulations of the last two ribs with the spine are very lax, and their anterior ends being free, they follow the movements of the abdominal walls in which they are imbedded; they commonly descend in abdominal inspiration, and ascend in the inferior costal movement. The first rib is peculiarly moveable in women, and those who breathe like them; nearly, or quite immoveable in men and animals which breathe habitually with the lower ribs and abdomen. And herein is the solution of the question of the mobility or immobility of the first rib, as well as of that respecting the relative degrees of freedom of motion in the other ribs; they vary according to the peculiar type of the respiratory movements.

The shortness and early ossification and anchylosis of the first costal cartilage, make the sternum participate much more in the movements of the upper ribs than it does in those of the lower ones; hence, the antero-posterior enlargement of the chest in inspiration is much greater in women than in men. The increase of the intercostal spaces in inspiration is directly proportionate to their natural width; greatest, therefore, above in women, and below in men. In both, the increase is far greater anteriorly than it is posteriorly. In forcible expiration, the width of

* Archives Générales de Médecine, Décembre, 1842, Mai, Juillet, 1843.

the intercostal spaces may be reduced to considerably less than it is in ordinary expiration.

MM. Beau and Maissiat investigated also at great length the actions of the respiratory muscles, both by feeling and looking at them while in action, and by vivisections of dogs. Their conclusions, so far as the muscles are concerned in respiration, are briefly as follows, and many of them may be confirmed by observation on one's own person. *Intercostals:* In inspiration, they are elongated, and become hard and concave on their outer surface; in quiet expiration, they are moderately shortened, and become less hard and flat; in complex and forcible expiration, they become prominent and very short and hard. They are therefore muscles for forcible expiration, like their analogues, the oblique muscles of the abdomen; their hardness in inspiration is due to their being stretched; but their contraction (except by their elasticity) is only seen in forced expirations or in efforts.

[For many reasons, this conclusion must be considered very doubtful. The experiment on which the authors chiefly found their belief that the intercostals cannot raise the ribs, consisted in cutting through the pectoral muscles and the whole length of the intercostals between the sixth and seventh ribs on both sides: after this was done the lower ribs were still raised in inspiration (as they suppose) by the diaphragm. Perhaps no conclusion ought to be drawn from the results of such mutilation; but M. Debrou (Gazette Médicale, Jan. 3, 1843,) having repeated the experiment, with the addition of cutting the diaphragm from the ribs, and having found that the ribs were still raised in inspiration, maintains that the five lower ribs are thus raised by their intercostal muscles, and that the sixth, from which the intercostals above were cut away, is *pushed* up by the fifth. The following arguments appear to me conclusive in favour of the usually inspiratory action of the intercostals. 1. When the spinal cord is injured below the origins of the phrenic nerves and above those of the intercostal nerves, the ribs are very nearly motionless in respiration, for the intercostal muscles are paralysed though the diaphragm is active. 2. The upper ribs are chiefly moved in the superior costal respiration, though the diaphragm cannot act upon them. 3. The levatores costarum, which can act in inspiration alone, have an arrangement exactly analogous to that of the external intercostal muscles. 4. Whenever the intercostal muscles are affected by diseases in which the pain is increased by muscular contraction, there is an increase of pain in inspiration.] The authors believe also (and with more probability, for whatever be their ordinary action, the intercostals may in extraordinary circumstances, act in either direction,) that in forcible expiration they serve to make the whole walls of the chest rigid and resisting, so that they may not be distended by the eccentric impulse of the lungs, which are compressed on every side, and especially by the diaphragm. *Levatores costarum:* supposed (but improbably) to be not concerned in respiration, but to serve for maintaining the spine erect. *Infra costales:* probably muscles for forcible expiration, like the internal intercostals. (?) *Triangularis sterni:* a muscle of expiration, by drawing together the sternum and the costal cartilages. *Scaleni:* muscles of inspiration, especially in the superior costal type of movements, but chiefly flexors of the head. *Sterno-mastoid:* auxiliary to the scaleni in forcible inspiration. *Trapezius:* its upper border assists in forcible inspiration, its lower border in forcible expiration. *Levator anguli scapulæ:* acts with the upper part of the trapezius in violent inspiration. *Subclavius*, depressor of the clavicle after forcible inspiration. (?) *Latissimus dorsi:* its lower border acts in forcible expiration, as one may find by feeling the posterior wall of the axilla while coughing; at the same time it makes rigid those parts of the walls of the chest and abdomen on which it lies, and it presses in the lower ribs. *Serratus magnus:* acts in forcible inspiration, but chiefly (as was shown in a patient in whom it alone was paralysed,) it serves, by cooperating with the deltoid, in raising the arm. *Serratus posticus superior:* not a respiratory muscle, (?) but an extensor of the neck. *Serratus posticus inferior:* expiratory. *Pectoralis major:* its lower quarter is a muscle of inspiration, its upper three fourths form one of expiration, but it does not act except in dyspnœa. *Pectoralis minor:* its lower half acts habitually (?) as a muscle of inspiration.

As to the action of the diaphragm, the authors believe that it produces, 1. Elongation of the thoracic cavity, especially in the abdominal type of respiration. 2. Increase of the transverse diameter, by elevating and turning outwards the lower ribs, as in the experiment quoted in a preceding note; and this especially in the inferior costal respiration. 3. Occasionally, in infants, the depression of the costal cartilages. The second of these actions of the diaphgram is also described by M. Magendie.* The true mode of action is probably this: when the muscular fibres of the diaphragm contract, its central portion descends, and at the same time traction is exercised on the ribs at the peripheral ends of the fibres; and when the resistance to the descent of the diaphragm is greater than the resistance to an upward motion of the ribs, these are raised by the fibres which are attached to them, and whose direction, even in moderate inspiration, is nearly vertical. And this drawing upwards of the ribs is necessarily converted into a movement upwards and outwards by the limited and peculiar mobility of their attachments to the vertebræ and sternum. The third assigned action, that of the occasional depression of the inferior costal cartilages in children, is more reasonably ascribed by Mr. Alexander Shaw† to this, the most pliant part of the walls of the chest, being pressed in by the atmosphere when the other parts of the chest are expanded to a size which the lungs cannot attain, on account either of disease of their structure, or of obstruction to the free entrance of air through the larynx and trachea.

Structure of the Lungs. Mr. Addison‡ has given an account of the anatomy of the minute air-passages which, while it confirms nearly all that Reisseissen observed, is more complete, and very probably true. In the fœtus the ultimate bronchial subdivisions are tubular; they have a regularly branched arrangement, ramifying symmetrically in all directions, and terminating without anastomoses in closed extremities which are generally situated at the boundaries of the lobules. But when an animal has respired, the entrance of the air into the lungs distends the lobules, and the ultimate bronchial subdivisions undergo a great change. The membrane composing each of them offers only a feeble resistance to the pressure of the air, and is pushed forwards and distended laterally into rounded inflations, forming a series of communicating cells, which meeting on all sides those of the adjoining bronchial subdivisions, are moulded by the mutual pressure into various hexagonal and pentagonal forms. These distended passages (something like large beaded tubes) Mr. Addison calls *lobular passages;* and a section of them shows the *oval foramina* leading from cell to cell, which are so conspicuous in a thin layer of inflated and dried lung. The *air-cells*, according to this account, are the inflated parts of the *intralobular* bronchial subdivisions; and those of each lobule form a distinct system, having no communication with those of the adjacent lobules, except in the common trunk from which the intralobular bronchi of each system are derived. The air-cells are from 1-200 to 1-500 of an inch in diameter; and the oval foramina are from 1-60 to 1-150 of an inch or less in diameter. The blood-vessels lie upon each *lobular passage*, and between each two of them.

Capacity of breathing. M. Bourgery's examinations of the structure of the lungs are detailed in vol. XIV, p. 546. They may easily be reconciled with the more probable account of Mr. Addison, from which they chiefly differ in that the minutest branches of the bronchi are described in them as freely anastomosing, so as to form a series of labyrinthic canals; and that the constrictions of the tubes by which they are formed into cells or loculi are said to be due to annular vessels surrounding them. M. Bourgery§ has more recently examined the relations of the varying structure of the lungs in different ages and sexes to their functional capacity. The subjects examined were fifty males and twenty females, and the deductions are as

* Précis de Physiologie, p. 310.

† London Medical Gazette, Oct. 29, 1841.

‡ Philosophical Transactions, Part II, 1842. An abstract, from which the above is taken, is in the Trans. of the Prov. Med. and Surg. Association, 1843, vol. xi, p. 281.

§ Paper read at the Académie des Sciences, Janvier 23, 1843; Arch. Gén. de Médecine, Mars, 1843; Gazette Médicale, and other French journals of the same date.

follows: 1. The measure of respiration (that is, I think, the proportion between the quantity of air which can be taken in by a forced inspiration, and the quantity which the lungs just previously contained) is always the greater the more youthful and lean the person is: strength and health do not in this regard compensate for youth. 2. The measure in males is twice as great as in females of the same age. 3. The function is at its highest point in both sexes at thirty years of age—the age which corresponds with the completest development of the aërial capillary plexus, or finest branches of the bronchi. At this age a forced inspiration increases the air in the chest from 2·5 to 4·3 litres in males, and from 1·1 to 2·2 in females. The boy of fifteen inspires two litres, the man of eighty, 1·35. 3. The volume of air necessary for an *ordinary* inspiration increases with advancing age; and this increase exactly represents the diminution of the energy of the pulmonary hematosis. 4. The capacity of the lungs for forcible inspiration increases from infancy to the age of thirty, doubling itself in twenty-three years. After thirty it diminishes one fifth in the first twenty years; one fifth more in the next ten; and nearly one half in the next twenty; and this gradual decrease of capacity for forcible inspiration is true of all persons, although one may have a greater general capacity of respiration than another of the same age. Hence the young person possesses a great capacity of respiration, as it were, in reserve; the old man has little, and is therefore unfit for great exertion.

Exhalation of carbonic acid. MM. Andral and Gavarret* state the following as the results of experiments made in sixty-two persons (thirty-six males and twenty-six females), to determine the quantity of carbonic acid exhaled in breathing: 1. At all ages beyond eight years the exhalation is greater in males than in females. 2. In males it regularly increases in quantity from eight to thirty years of age; from thirty to forty it is stationary or diminishes a little; from forty to fifty the diminution is greater; and from fifty to extreme age it goes on diminishing till it scarcely exceeds the quantity at ten years. 3. The quantity of carbon exhaled in the form of carbonic acid in one hour by males of different ages is as follows;—at eight years, 77·5 grains; at fifteen, 135 grains; at twenty, 176·7 grains; between thirty and forty, 189 grains; between forty and sixty 156 grains; between sixty and eighty, 142 5 grains; and in a man of 102 it was only 91·5 grains. 4. In females the same proportionate increase goes on to the time of puberty, when the quantity abruptly ceases to increase, and remains stationary so long as they continue to menstruate. When, however, menstruation has ceased, the exhalation of carbonic acid begins again to augment; and, then again, in advancing years, decreases as it does in men. Thus before puberty the quantity of carbon exhaled by girls in an hour is ninety-nine grains: and so it continues while the habit of menstruation continues; afterwards, from thirty-eight to forty-nine years of age, it increases to 130 grains; from fifty to sixty again falls to 113 grains; from sixty to eighty is reduced to 105 grains; and in a woman of eighty-two, was only ninety-three grains. 5. In amenorrhea the exhalation is always increased. 6. In pregnancy the exhalation is equal to that which is natural soon after the cessation of menstruation. 6. *Cæteris paribus*, the more robust a person is the more carbonic acid is exhaled; but the differences are not great. 7. The maximum of exhalation was in a strong man of twenty-six, who in an hour exhaled carbonic acid containing 218 5 grains of carbon; the proportionate minimum in a weak man of forty-five, who exhaled in the same time only 139·5 grains. 8. The influences of the weights of persons, of the capacities of their chests, and of the extent of the respiratory movements, are not great.

DIGESTION.

Structure of the teeth. Mr. Lintott† has pointed out the fact of a regular and

* Recherches sur la quantité d'Acide Carbonique exhalé par le Poumon.—Paris, 1843.

† On the Structure of the Human Teeth.—Lond. 1843; abstract in the Lancet, June 24, 1843. There are some excellent illustrations of the mode of growth of the teeth, in Mr. A. Shaw's paper "On the effects of rickets upon the growth of the skull," in the Medico-Chirurg. Trans. 1843, vol. xxvi.

constant formation of a layer of bone or, probably, of imperfect ivory like what Mr. Nasmyth has called ossified pulp, within the pulp-cavity of the human tooth, after the age of twenty years, independently of any wearing down of the enamel. The layer is thickest at the orifice of the dental cavity, and gradually diminishes as it descends into it till it is lost upon the walls; its thickness increases with advancing age. He remarks also that the part which is by far the most frequent seat of the commencement of decay in the molar teeth is the groove which separates the tubercles of their crowns, and at which the operculæ (according to Mr. Goodsir) meet when the papillary is changed into the capsular stage of development. These grooves are first affected as regularly in the upper as in the lower jaw; as if they were from the first imperfectly developed: [that is, probably, they are liable to the imperfections of parts last formed, such as are often seen in the other *lines of median* or *central fusion.*]

Salivary secretion. Dr. Budge* has found that after extirpation of the parotid, submaxillary, and sublingual glands in a dog and a rabbit, the secretion of saliva continued; its characters remained the same, and no function was disturbed. [The experiments add probability to the opinion that the labial, buccal, palatine, and other glands which the experimenter left behind, are salivary glands.]

A case of a kind of metastasis of the salivary secretion is related by Dr. Roelants,† and is interesting in its relation to the general physiology of secretion. A man, eighty-two years old, had an attack of bronchitis, with fever, followed by suppuration around and probably in one of the parotid glands. The abscess was opened, and two months after a large mass of chalk-like substance was discharged. The abscess soon healed, and he recovered his health; but now, whenever he masticates, saliva flows freely from the skin of the cheek and temple of the side formerly diseased. As soon as he begins to eat, the skin becomes very full of blood, and hot; and gradually drop after drop of clear fluid, with all the characters of saliva, collects on its surface, and runs down the cheek and neck, and continues to do so just as long as he continues eating. His health is not disturbed, and the saliva-secreting surface of the skin is natural in its texture.

Anatomy of the pharynx. Professor Mayer of Bonn described some time ago‡ a *bursa pharyngea* in many mammalia. He has since found it several times in men. It lies in a corresponding position to that which it occupies in the mammalia, namely, in the middle line in the mucous membrane covering the body of the sphenoid bone, just behind the posterior border of the vomer. It is sometimes large enough to hold a cherry-stone, and in one case was double. He thinks it probable that in other mammalia, in which the bursa is larger, it may sometimes communicate with the sphenoidal sinuses.§

Functions of the stomach. MM. Sandras and Bouchardat,‖ assuming that, in general, dissolved substances are absorbed by the veins of the stomach, while those that are insoluble are taken into the lacteals, believe that they have proved that the chief classes of aliments are thus disposed of: 1. Fibrin, albumen, caseum, gluten, and the gelatinous tissues are dissolved by the aid of hydrochloric acid; [and, probably, of pepsin.] A mixture of six parts of this acid with 10,000 of water they found sufficient to make all these principles swell up into translucent

* Schmidt's Jahrbucher, Bd. xxxv, Heft 3. Dr. Budge's conclusions on the chemical and other characters of the saliva are confirmatory, so far as they go, of the statements in the essays by Dr. Wright, (Lancet, March 5, 1842, and following numbers;) of which I must regret that those relating to the composition of the saliva were published before the date at which this report commences. Many of them are confirmed also by Lehmann. (Schmidt's Jahrbucher, 1843, No. viii, p. 156.) He however states that he has always found sugar altered by saliva, lactic acid being produced by their contact at 95 deg. Fahr. See also on this subject the review of Schultz, Ueber die Verjungung, &c. in vol. XVI, p. 232.

† Heije's Archief voor Geneeskunde, 1842, St. iv.

‡ Froriep's Notizen, April, 1840.

§ Neue Unters. aus dem Gebiete der Anatomie und Physiologie—Bonn, 1842.

‖ L'Expérience, Février 3, 1843, from a paper read before the Académie des Sciences.

masses, and *sometimes* to dissolve them. 2. The starchy and saccharine principles are converted wholly or in part into lactic acid, and in that form are absorbed in the stomach. 3. The fatty matters are insoluble, and pass into the intestines, where they are taken up by the lacteals, and form the greater part of the chyle. The experiments which were performed to confirm these opinions before the reporters to the Institute did not succeed well; but if they had done so it would still be hard to explain how the albumen and fibrin can be formed in the chyle from fatty matter alone. Still that some of the starch of food may be transformed and absorbed in the stomach is confirmed by the experiments of Dr. Percy.* These make it probable, 1, that sugar is formed in the stomach by the digestion of starch or wheat flour, though neither these experiments, nor any others yet performed can afford demonstrative evidence of it; 2, that the dextrin into which the starch is first transformed may be at once absorbed, so as to reduce the quantity of sugar which is formed; and 3, that the sugar which is formed must be quickly further changed or absorbed. The latter is the more probable conclusion, and best accounts for the very small quantity of sugar which is ever found after feeding on starch. Lastly, Dr. Percy suggests, that in the cases in which Dr. McGregor found sugar in the stomachs of those diabetic patients who for several days had had only animal food, it might be formed by the oxydation of the fat which is constantly being absorbed from the body during emaciation.

Composition of the bile. Dr. Kemp,† by careful elementary analysis of the bile of the ox, has corroborated Demarçay's opinion that it is essentially a true chemical compound of an electro-negative body with soda. But he holds that this body is neither the *choleic acid* of Demarçay, since it is not precipitated from the soda by acetic acid, nor the *bilin* of Berzelius, because it is not precipitated from the soda by carbonic acid. He has therefore given it the name of *bilic acid*. It has a peculiar bitter-sweet taste, and in mass resembles a fine resin. It is soluble in every proportion in water. In a subsequent paper‡ he has shown that a much greater difference than is usually imagined is effected in the bile while in the gall-bladder. Bile from the hepatic ducts of an ox was destitute of the bitter taste of cystic bile; its smell also was different. It chiefly consisted of two different electro-negative bodies, separable by alcohol, and each combined with soda.

ABSORPTION.

M. Lacauchie§ describes the intestinal villi as possessing during life a power of alternately retracting and elongating themselves by a kind of vermicular motion, which he believes to be influential in the propulsion of chyle. And his account, so far as these movements are concerned, is confirmed by MM. Gruby and Delafond,|| who have observed them in the recently-slain horse, dog, and rabbit. They add that besides the movements of retraction and elongation, the villi are capable of moving laterally in all directions, and that their epithelium-cells bear ciliæ.

Some experiments by Dr. Behr¶ may serve, perhaps, to explain somewhat of that which was supposed to depend on an elective power of absorption possessed by the lymphatics, and certainly have added much to the probability that the force by which the lymph is carried along the lymphatics is that of the contraction of their walls.** It has been long known that the lymphatics will not convey certain

* "Case of Diabetes," Medical Gazette, April 7, and following numbers, 1843.

† London Medical Gazette, Dec. 16, 1842, and March 3, 1843.

‡ Medical Gazette, May 5, 1843.

§ Paper read at the Académie des Sciences, May 15, 1843, see Comptes Rendus and contemporary journals.

|| Paper read and reported as above, June 5, 1843. MM. Gruby and Delafond assign to the epithelium-cells of the villi nearly the same offices as are, with much more probability, assigned by Mr. Goodsir to the transitory cells developed within the villi.

¶ Henle and Pfeufer's Zeitschrift, für ration. Medicin. Heft i, 1842, and Schmidt's Jahrbucher, Heft iii, 1843.

** See last Report.

substances, especially narcotic poisons, while they do carry others. If, for example, the animal's abdominal aorta be tied so as to stop the circulation in its posterior extremities, and ferrocyanate of potass be inserted in a wound in one of them, it is absorbed and carried into the blood by the lymphatics, and is found again in the urine. But if, under the same circumstances, a narcotic poison is put in the wound the animal is not killed by it; and it was supposed that the lymphatics in this exercised some kind of choice. The results of Dr. Behr's experiments are these: 1. Acetate of strychnine was introduced into a wound in an animal's leg, while the circulation was uninterrupted, and death, with convulsions, &c., occurred in five minutes. 2. Ferrocyanate of potass was introduced into a similar wound, and ten minutes after acetate of strychnine into another wound: in four minutes the animal died of the poison, and the ferrocyanate was found in the urine. 3. The same substances were introduced together into a wound in the leg: the animal died poisoned, and even sooner than before, and the salt was found in the urine. 4. The abdominal aorta was tied below the renal arteries, and when the hind limbs were paralysed the acetate of strychnine was put into a wound in one leg and the ferrocyanate of potass into a wound in the other. After two hours and half there were no signs of poisoning but on killing the animal the salt was found in the urine. 5. The abdominal aorta was tied as in No. 4, and the acetate of strychnine and ferrocyanate of potass were introduced into the same wound. The animal showed no signs of poisoning, and the salt could not be found in the urine. This last experiment was several times repeated, and, with unimportant variations, with a constantly similar result. It would follow, therefore, that when the circulation in the blood-vessels is stopped, the lymphatics can absorb and convey to the blood ferrocyanate of potass, but not acetate of strychnine; and that when the two substances are applied to them together it can absorb or carry neither. Hence it is supposed that the force by which the lymphatics convey fluids is that of the contraction of their walls, and that they are paralysed by the direct contact of narcotics, as other involuntary muscles are.

Mr. George Robinson* has related some experiments in evidence that the absorption of blood-vessels depends on a force generated by and proportioned to the velocity of the blood which is moving in them. He compares it to that force with which water or any other fluid traversing a main tube will draw fluid through a side branch, even against the weight of a considerable column. He has often repeated this well-known experiment, and has added proof that the same force will act in the same way through one or more membranes. Having filled a wine-glass with coloured fluid, and having connected its contents, (by means of a bent tube twelve inches long and $\frac{1}{16}$ of an inch in diameter, and having one of its ends covered with membrane,) with the interior of a pipe half an inch in diameter, he found that within five minutes after the stream had begun to flow rapidly through the last-mentioned pipe, the whole of the air present in the smaller tube was absorbed, and its place supplied by the coloured fluid, which had risen from the glass. In another experiment the fluid from the glass was raised through a shorter tube to the membrane, and was made to flow in a slow but constant stream towards the fluid, passing through the larger pipe.

TRANSFORMATIONS OF NUTRITIOUS SUBSTANCES.

Among the numerous papers written on the transformations which the food undergoes in its passage in the body, the most interesting and almost the only ones which afford any definite conclusion are those relating to the formation of fatty matters from the saccharine and starchy principles. It seemed to be proved by Huber's experiments on bees that wax could be formed by them out of pure sugar or honey; for when their food contained nothing but one of these they formed their combs as usual. M. Dumas, who had opposed Liebig's deductions from these facts, suspected that the wax might be formed from the fat which the bees had in their own bodies before they commenced their purely saccharine diet. He therefore,

* Lancet, May 27, 1843.

with M. Milne Edwards,* repeated the experiment, and in a successful trial obtained the following results: 1988 bees were inclosed in a hive, and from an analysis of the bodies of 117 from the same stock it was estimated that the bodies of the 1988 contained 3·218 grammes of fatty matter. The honey on which they fed contained $\frac{8}{10000}$ of waxy matter. The experiment was continued thirty-one days, and the bees consumed 834·889 gr. of honey, and produced 11·515 gr. of wax, or at the rate of 0·0064 for each bee. After the experiment 105 bees were analysed, and yielded 0·442 gr. of fatty matter, or at the rate of 0·0042 gr. each. Thus the fatty matter preexisting in each bee was 0·0018 gr., and the quantity furnished to each in its food was 0·0038: but each produced in thirty-one days 0·0064 gr., and each at the end contained 0·0042, giving a total of fatty matter 0·0106, and an excess, which must have been formed by transformation of the food, equal to 0 00742 gr. per bee.

The old view of the production of the oleaginous constituents of the bodies of herbivora by the transformation of the saccharine and amylaceous principles of their food is thus confirmed; and the evidence is the better for its being honestly published by one who had been the chief opponent of the view. Connected with it is a fact recently observed by MM Pelouze and Gelis,† that under certain circumstances, butyric acid is formed during the fermentation of sugar. By the action of the acid thus obtained upon glycerin they formed also butyrin, another of the constituents of butter. Still, however, the results of the experiments on which Dumas' former opinion was founded are important, as proving that the several articles of food of the herbivora contain a much larger proportion of fatty matter than had been imagined. In maize and other grains, for example, he has found from 7 to 9 per cent., and in grass, hay, &c. considerable proportions, which in all probability contribute to the formation of the fat, though they are not its only source.

Assimilation. In the last Report‡ some remarkable observations were referred to, proving the analogies between the forms assumed by certain inorganic precipitates such as those of the carbonates of lime and iron, and the forms of the nuclei and cells of organic tissues. Now, Dr. Hermann Jordan,§ of Saarbrück, has called attention to the phenomena of the reparation of damaged crystals, as bearing analogy to the repair of injured organized bodies. The facts which he establishes are these: 1. Any portion of crystal—whatever surfaces, angles, or edges may have been removed from it—may, under proper circumstances, repair itself into a complete individual; that is, restore itself to the same form which it would have had if no injury had been done to it. 2. At the same time with the reproduction of the truncated part, a growth of the whole crystal takes place: *but the effort of the formative act is especially directed to replace the lost part.* 3. The effort at reparation stands in a direct relation to the extent of the loss, and decreases in proportion as the loss is replaced. 4. He points out the mode in which the process of reparation takes place, and concludes that his examinations "have demonstrated the tendency of individuals to maintain their integrity and to replace material losses by the formation of more matter, according to the type of their original form, as a phenomenon to be observed as well in inorganic as in organic nature —as a phenomenon which belongs to the individual as such, whether it have a membered body or the simple structure of a crystal."

ORGANS OF ANIMAL LIFE.

Chemical composition of bone. The following are the results of the most recent and careful analyses of human bone, by Marchand and Lehmann. In both cases

* Paper read at the Académie des Sciences, Paris, Sept. 18, in the Comptes Rendus, and contemporary journals. Before the publication of these experiments many controversial papers of much interest had appeared, many of which may be found in the Annales de Chimie et de Physique, and the Annalen der Chimie und Pharmacie, January, April, &c. 1843, as well as in the contemporary numbers of the Gazette Médicale, the Medical Times, the Annals of Chymistry, &c.

† Paper read and reported as above, Juin 12, 1843.

‡ See p. 12. § Müller's Archiv, Heft i, 1842.

the bones were deprived of fat and periosteum : in each the average of six examinations is given; Marchand's* were made on thigh-bones, Lehmann's† on the long bones of the arm and leg.

			Marchand.	Lehmann.
Organic matter	Cartilage insoluble in H.CL.	27·23	33·26	32·56
	„ soluble „	5·02		
	Vessels	1·01		
Phosphate of lime			52·26	54·61
Fluate of lime‡			1·	
Carbonate of lime			10·21	9·41
Phosphate of magnesia			1·05	1·07
Soda			0·92	1·11
Hydrochlorate of Soda			0·25	0·38
Oxydes of iron and manganese and loss			1·05	·86
			100·	100·

The following are average relative proportions of organic and earthy matter, collected by Lehmann from his own and the analyses of two other observers.

	Sebastian.	Lehmann.	Frerichs Compact bone.	Frerichs Spongy bone.
Organic	36·66	32·28	31·2	37·82
Earthy	63·34	67·72	68·8	62·18

All found that the earthy matter increases with age.

In a memoir on ancient and fossil bones, M. Gerardin§ states that the degrees of alteration which buried bones undergo depend almost entirely on the degrees in which the soils are exposed to air and moisture. They always lose more or less of their animal matter; and sometimes, when they lie in a soil traversed by streams of water, it is completely removed: the ammonia proceeding from the part first decomposed saponifies the rest and makes it soluble. In human bones long buried and in fossil bones there is always more subphosphate of lime than in recent bones; in *human bones* long buried the proportion of carbonate of lime is generally diminished, in fossil bones it is increased. In fossil bones also there is always some fluate of lime; in human bones, under whatever circumstances, there is none: it seems to be introduced into fossil bones by infiltration from without, and its presence may be depended on as a sign that a bone is really fossilized.

Structure of bone. Dr. Fleischmann|| has described the minute structure of *vegetable ivory*, from the fruit of the *manicaria saccifera*, (Gärtner,) a species of palm growing near the coast of Guiana, as being closely analogous to that of bone, at least in regard to the *corpuscles* which it presents. It possesses also, he says, somewhat of the chemical properties of bone. Thin sections exhibit the most beautiful structures, like the bone-corpuscles, except that they are more regular, and lie within regularly-formed cells, of which they appear to be the nuclei. Branches like the calcigerous canals proceed from each corpuscle, but do not give off smaller branches nor extend beyond the wall of the cell; each branch ends within the cell-wall in a bluntly-closed extremity. He believes that there is the same arrangement in true bone; that each corpuscle has, like a nucleus, a distinct cell-wall around it, such as he has figured in a section of bone from a child; that the canals of the corpuscles are unbranched, and that they end within the cell-walls, having only an appearance of anastomosis with the canals in adjacent cells.¶

* Journal der Prakt. Chemie, Bd. xxvii, p. 83.

† Schmidt's Jahrbucher, 1843, No. vi; see also the Chemist, 1843, Nos. 1, 2, and 3.

‡ See the next paragraph from M. Gerardin, whose analyses confirm those of Mr. G. O. Rees, in denying the presence of fluate of lime in human or any but fossilized bones.

§ Report from the Académie des Sciences, Gazette Médicale, Oct. 15, 1842.

|| Müller's Archiv, 1843, Heft iii, p. 202.

¶ In these two last opinions he is certainly wrong; the first is in accordance with the

The chapter on 'Bone,' in the 'Physiological Anatomy' of Todd and Bowman, contains by far the best plates yet published of the minute osseous structure. The ultimate structure also is there described, from preparations made by Mr. Tomes, to be granular. The ultimate granules vary in size from 1-6000 to 1-14000 of an inch; they are oval or oblong, and cohere firmly, possibly by the medium of some second substance. In some instances Mr. Tomes has met with a very minute network, which seems adapted to receive them in its interstices; but this, he considers, requires confirmation.

Process of ossification. In the same work is a description of the process of ossification, which is, in several points, new and interesting, (p. 117.) In the vicinity of the point of ossification the nucleated cartilage-cells (which usually are scattered irregularly) arrange themselves in linear series, which run down, as it were, to the ossifying surface. At first the series are small and not regular, but nearer to the ossifying part they form rows of twenty or thirty. The cells in these rows are closely compressed, and their nuclei seem flattened. The lowest rows dip into and rest in deep narrow cups of bone, formed by the osseous transformation of the intercellular substance between the rows, and as ossification advances these cups are converted into closed areolæ or *cancelli*, with extremely thin lamelliform walls. Immediately upon the ossifying surface nuclei, which before were closely compacted, separate considerably from one another by the increase of material within the cells: they also often enlarge and become more transparent. Deeper in the new bone the lamellæ which inclose the cancelli, and which were formed by the ossification of the intercellular substance, are found thicker and more like perfect bone: they include in their substance elongated oval spaces, which, except that they are roughly granular, exactly resemble the ordinary *bone-corpuscles*, and which are evidently the nuclei of the cells of the temporary cartilages. The curvilinear outline of the now ossified cells of these nuclei can often be discerned. Within the cancelli only a few cells can be detected, these cavities (of the cancelli) being chiefly occupied by a quantity of new substance, consisting of granules, and resembling a formative blastema or basis. It thus appears that after the ossification of the intercellular substance, (by which are formed the lamellæ which are the walls of the cancelli,) the rows of cartilage all arrange themselves on the inner surface of these newly-formed cancelli, and are ossified, with the exception of their nuclei, which remain granular, and subsequently form the corpuscles of bone; and that a new substance or blastema appears within the cancelli, from which, probably, vessels are developed, and the further steps in the growth of the bone proceed.

NERVOUS SYSTEM.

Minute structure. Remak* says that on the axes of each of the larger primitive tubes of the abdominal nervous cord of the River Cray Fish (*astacus fluviatilis*), there is, in the recent state, a winding bundle of extremely delicate fibres, occupying one third or one fourth of the whole diameter of the tube. The fibres of this *central fasciculus* are smooth, parallel, without branches or anastomoses, and less than 1-5000 of an inch thick. They may be seen distinctly when the tubuli are injured: some of them often protrude from the broken extremity. They are found, however, only in tubules from 1-60 to 1-30 of a line in diameter; smaller tubules than these either appear translucent or contain a fine granular substance, and none but the smaller tubules, such as these, are found in the nerves and nervous trunks near the abdominal cord. The spaces between the central fasciculi and the walls of the larger tubules are filled by a clear, colourless fluid. The relation of the central fasciculus in the large tubules of the nervouscord to the central substance of ordinary nerves (the *primitive band* of Remak,) is uncertain.

Repair and union of nerves. Dr. Bidder,† of Dorpat, has made several experiments to determine whether nervous filaments of originally different functions can be made to unite. He experimented on the lingual and hypoglossal nerves

manner in which Henle supposes the corpuscles and their canals to be developed by a deposition within cells, having in each a central cavity (the corpuscle) and interstitial passages or pores (the canals). See his Allgemeine Anatomie, p. 182.

* Müller's Archiv, 1843, Heft iii, p. 197. † Ib. 1842, Heft i and ii.

of dogs, but the results were inconclusive. They tended, however, to prove that such a union does not take place; for in several of the cases the connected portion of the two trunks were found, on subsequent examination, disparted, and each had united again with that portion of itself from which it had been separated. It was found that a sufficient union for the restoration of function can take place in three or four months, although a portion of a nervous trunk eight lines in length has been completely removed.

Reflex action. Some evidence in favour of the view that the nerves of the excito-motory system form a system distinct from those conveying sensation and volition, is afforded by the investigations of Mr. Newport.* He finds that in the myriapoda the fibres which correspond to the true spinal cord in vertebrata are distinct from those connected with the cephalic ganglia. They form part of the cord in the intervals between the abdominal ganglia, and may be traced from the periphery into the several ganglionic centres, from which they pass backwards along the cord until they arrive at the next ganglion, from which they pass again to the surface of the body. Now there is reason to believe that the ganglia are not sensitive; for the reflex acts, which are repeatedly performed after the removal of the head or destruction of the central ganglia, are performed without any appearance of volition being exercised in them and always in one and the same manner.

Influence of the nervous centres. Professor Volkmann,† one of the most accurate experimenters of modern times, has occupied himself in testing the value of those experiments which are supposed to prove the direct influence of the central nervous organs upon the movement of the viscera.

With regard to the part of the centres on which the movements of the heart depend,—Volkmann shows that in fresh-slain animals the movements of the heart are so completely irregular, even when left to themselves—in one half minute hurried, in the next retarded, then stopping for one or more minutes and then of themselves going on again—that it is impossible to determine the influence of any supposed excitant of the brain or spinal cord. From a great number of experiments, very carefully conducted, no fixed result could be arrived at except this, that the existence of any direct influence exerted on the heart by irritating the nervous centres is as yet altogether doubtful.

He has come to the same conclusion, upon equally good negative evidence, in regard to the effects supposed to be produced on the motions of the stomach and intestines by irritating the brain and cord. He could find no such influence exerted. The motions of the alimentary canal often entirely cease for a long time, and are then of themselves renewed; but when once they have entirely ceased, no irritation of the nervous centres can reproduce them, although it is certain that after the canal ceases to move the nervous centres are still irritable. He peremptorily denies Budge's experiment in which he believed that though the peritoneum of the abdominal walls was left, the intestines moved when the central organs were irritated and ridicules the *active inflation* of the stomach, which Budge supposed to be thus produced. With equal positiveness he denies the truth of Budge's statements respecting the elevation and expansion of the testicle when a part of the cerebellum is irritated. In repeated trials he could produce no such effects as Budge reports, in either the digestive canal or the testes.‡ His conclusion is, "I am far from

* On the structure, relation, and development of the nervous and circulatory systems .... in the Myriopoda, &c., Transactions of the Royal Society, 1843. See also Br. and For. Med. Review, vol. XVI, p. 160, et seq., in which, in the review of Arnold and M. Hall on the reflex theory, both this and all the other evidence for the *anatomical distinctness* of the excito-motory system are adduced, with the exception of the observations by Van Deen presently to be mentioned. [Since the preceding was in type I have been favoured with the perusal of the further analysis of Mr. Newport's works contained in an earlier part of this Number, to which I must refer as affording a more complete account of them than could be inserted in the text.]

† Müller's Archiv, 1842, Heft v.

‡ The accuracy of several others of Dr. Budge's experiments and deductions is impugned by Dr. Stilling in Haeser's Archiv, 1842, Heft i, and in Schmidt's Jahrbucher, 1843, Heft ii, iii, &c.

denying that the central organs exercise an influence on the motions of the viscera, for pathological observations make that certain. But they do not prove that this influence is a direct one; and experiments on living or fresh-slain animals prove it still less."

Brain. In a very valuable contribution to the statistics regarding the weights of organs—of which, however, the greater part can as yet serve only to add to the necessary heap of evidence—Dr. John Reid* has made it probable; 1. That the cerebellum does not attain its maximum weight at seven or a few more years of age, though it does attain it sooner than the other organs, and the size of the whole brain, in proportion to the entire body, is greater in the child than in the adult. 2. That the average weight of the cerebellum compared with that of the whole brain, is a little greater in the female than in the male. 3. That though the male brain is on the average heavier than the female, yet in proportion to the weight of the whole body, it is rather less heavy. 4. That the brain does not in emaciation diminish in the same proportion as the rest of the body does.

M. Parchappe† has shown from his measurements and weighings that in regard to *the size of the head:* 1, that of males is to that of females as 16,128 : 15,294; 2, it increases gradually to the sixtieth year, chiefly through enlargement of the frontal sinuses, and after that time diminishes; 3, it is in same measure proportioned to the stature. And in regard to the *size of the brain:* 1, that the male is to the female brain, on an average, as 156 : 125, and that in weight they have about the same proportion; 2, that it increases to the fortieth year, and then decreases to the seventieth; 3, that it bears some proportion to the stature; 4, that the intellect is not absolutely proportioned to the size of the brain, but is proportioned to the size of the hemispheres, and especially to the extent of their surfaces.

Dr. George Burrows‡ having repeated the experiments of Dr. Kellie and performed others has shown, in opposition to the opinions commonly entertained, 1st, that the brains of animals bled to death are deprived of their blood, and rendered pale and anæmic; 2, that the quantity of blood in the head is greatly affected by posture and gravitation; 3, that in death by apnœa there is intense congestion of the cerebral vessels. And from these facts and from several considerations he deduces that the opinion that the quantity of blood within the cranium is at all times the same is untrue. Admitting that the total contents of the cranium must be at all times nearly the same, the cerebro-spinal fluid is rapidly removable from one site to another, and capable of being altogether removed by absorption; so that this fluid may be regarded as supplemental to the other contents of the cranium—at one time giving place to the increased quantity of blood, at another making up for the deficiency of blood in the vessels and in the same manner varying according to the actual quantity of nervous substance.

Spinal cord. From Dr. Knox§ we have a description of the spinal arachnoid, maintaining that the account usually given of it and of the absence of any regular communication between its cavity and that of the cerebral ventricles is correct, in opposition to the descriptions of Dr. Sharpey and Mr. Ellis.

Drs. Stilling and Wallach‖ deny the existence of globules in the gray matter of the spinal cord, and say that those which have been held to be globules are fragments of divided nerve-tubes. These tubes of the gray matter they describe as differing from those of the white in being of less diameter, having thinner external walls, and being differently coloured. The course of some of them is longitudinal; that of others transverse, and these are continued into the white substance of the cord, crossing the direction of its fibres, but never uniting with them. The

* London and Edinb. Monthly Journal of Med. Science, April, 1843.
† Gazette Médicale, Octobre 8, 1842.
‡ Medical Gazette, April 28, and May 5, 1843.
§ Medical Gazette, June 23, 1843.
‖ This account is taken from an analysis of their work (Untersuchungen über die Textur des Rückenmarks, Leipzic, 1842, 4to,) in the Allgem. Medic. Central-Zeitung, Febr. 22, 1843. I have not had time to see more, since obtaining the original, than that the analysis given of it is generally correct.

filaments of the roots of the nerves are continuous, not with the white filaments or tubules of the cord, but with these its transverse gray filaments.

In some "Additional experiments on the spinal marrow," Dr. Van Deen* mentions two which he has frequently repeated in the presence of competent judges, to prove that the nervous fibrils of the limbs of the frog do not proceed to the brain, but terminate in the spinal marrow. In the first experiment the whole spinal marrow of a frog is exposed, and *all* the roots of all the nerves which go to the fore-legs and abdomen are cut on both sides; the marrow is then divided a little above the place where the nerves of the fore-legs are cut through, and its divided end being gently raised, a portion of glass or paper is pushed under it; but this is done only for the convenience of the further cutting. If now small portions of the spinal marrow are cut off successively from above downwards with great care and without shaking, no muscular movements are excited in the hind-legs; and the sections may be continued to within a little of the place at which the first lumbar nerve leaves the spinal marrow. It is on cutting this part that one first sees muscular motions in the upper part of the thigh; and as one goes on cutting lower down they ensue in both the hind feet.

In the second experiment all the roots of all the nerves of the hind legs are first cut on both sides of the cord, and a portion of paper being put under the lower end of the cord, pieces of the cord are cut off in succession from below upwards. No signs of pain are induced, nor (even when the animal is beheaded) is any motion of the fore-legs excited, till one comes to that part of the cord from which the undivided roots are given off.

These two experiments prove, says the author, 1st, that the primitive fibrils do *not* pass through the spinal cord to the brain, since if that were the case every division of the cord in the first experiment must produce motion in the hind-legs, and every division in the second must have excited pain or, at least, some motion of the fore-legs; and 2dly, that the spinal marrow is not capable of propagating any irritation communicated to it to a great distance through itself, unless nerves are connected with it.

An interesting case bearing upon the physiology of the several columns of the cord is related by Dr. Webster.† There was complete loss of voluntary motion in the trunk and limbs, with retention of natural sensibility in them, and active reflex movements, in consequence of softening of the whole thickness of the middle part of the cervical portion of the spinal cord. The case is inexplicable in the present state of knowledge, unless we believe that Van Deen's experiments are conclusive which seemed to prove that the gray matter of the cord can, generally speaking, convey centripetal impressions to the brain, but not centrifugal impressions from it, and, besides, suppose that in this case the morbid change of the gray matter was not so complete as wholly to interrupt its functions. There are other cases sufficient to prove that considerable degrees of softening and other changes of structure of the cord may exist without complete loss of function.

Mr. W. F. Barlow‡ has published some good remarks on the influence of the impressions from sudden changes of temperature in producing reflex movements.

Particular nerves. Optic. Professor Erdl§ considers that he has traced the fibres of the optic nerves through the following long course: From the optic tract they diverge and expand in the substance of the thalami, then again converge towards the anterior part of the thalami and unite into a cord distinguished by its white colour, which descends into the corpora albicantia, forms a loop in them, and then turning upwards and forwards ascends through the anterior crura into the body of the fornix. From the fornix the fibres are continued into its posterior crura,

* Tijdschrift voor Natuurliche Geschiedenis en Physiologie, 1842, vol. ix.
† "Case of paralysis," &c. in the Medico-Chirurg. Trans. 1843, vol. xxvi, p. 1; also Report in the Lancet, Nov. 1843.
‡ Lancet, May 13, 1843.
§ Neue Medic. Zeitung, 1843, No. vii, and Oesterreichische Medic. Wochenschrift, May 25, 1843.

and into the corpora fimbriata, in which they descend into the pes hippocampi on each side, whence again they ascend in the tapetum to the posterior part of the corpus callosum, in which the fibres of the two sides again unite. He describes also the generally admitted fibres passing from one retina to the other through the anterior part of the optic commissure; and he supposes that the peripheral ends of these fibres are connected with those of the fibres whose course is described above, so as to form a kind of closed system or nervous ring.

Third nerve. Dr. Fäsebeck,* of Brunswick, describes a branch of the superior division of the third nerve, which is given off soon after that nerve enters the orbit, passes between the superior and external recti muscles of the eye, and penetrates the external rectus.† He describes also a branch one eighth of a line in thickness, going from the otic ganglion into the spheroidal sinus, another going from it to the vidian, and a third going to the tensor palati muscle.

Facial nerve. It was known that in paralysis of the facial nerve of one side the uvula was commonly drawn to the opposite side, and this was supposed to indicate that the facial is the motor nerve of the palate. Some doubt was thrown upon the conclusion by M. Debrou, who showed that the uvula in many persons was naturally not suspended in the middle line. But this objection has been removed by M. Diday,‡ who has observed a case in which the uvula was drawn to the opposite side while the paralysis of one nerve lasted, but gained its straight position when the paralysis ceased. It seems probable, therefore, that at the junction of the superior petrous branch of the vidian with the facial, branches are sent from (not to) the latter which go to the spheno-palatine ganglion, and thence through the posterior palatine nerves to the soft palate, as Soemmering believed.

Corda tympani. Dr. Guarini§ states that he can demonstrate visibly that the chorda tympani comes off as a distinct branch from the facial nerve, without any communication with the vidian. He gives the following reasons for believing that through the corda tympani the facial has a motor influence on the tongue. His experiments were often repeated before Panizza and others. 1. When the hypoglossal nerve is galvanized the tongue is moved convulsively forwards and backwards and upwards and downwards, but the fibres of the middle portion are quiet. 2. When the trigeminus is galvanized the tongue never moves. 3. When the facial is galvanized the tongue moves quickly upwards and downwards, and there is a kind of vermiform motion of its middle part. The first movement depends on the styloglossi muscles, which have a distinct branch from the facial; the second on the linguales, to which branches can be traced from each corda tympani. 4. After dividing the hypoglossal nerve the movements of the stytoglossus and lingualis alone continue, and these may be excited by galvanizing the facial. But the vermiform motion does not continue after (in the same case) the chorda tympani is destroyed.

Nervus vagus and *nervus accessorius.* Mr. Spence‖ has contributed a fact of great importance to the reconciling of the contrary statements respecting the motor functions of the pharyngeal and inferior laryngeal branches of the vagus nerve. He has traced a filament (distinguished from the rest of the vagus by its white colour,) which, arising from the groove between the olivary and restiform bodies, passes along the course of the vagus trunk, but goes over without joining the superior ganglion, and does not join the vagus trunk till just above the inferior ganglion. At this point of junction it is also joined by the internal branch of the accessorius, and from the junction of the two the pharyngeal branch of the vagus is given off.

* Müller's Archiv, 1842, Heft v.

† An observation of Retzius, made in 1841, that the sixth nerve supplies the retractor muscle of the eye in birds and mammalia, and the muscle of the nictitating membrane in the former appears not generally known by English physiologists, though it is important in the comparative physiology of the eye.

‡ Gazette Médicale, Dec. 24, 1842.

§ Annali Univ. di Medicina, Maggio, 1842, and Schmidt's Jahrbucher, 1843, Heft iii.

‖ Edinburgh Medical and Surgical Journal, Oct. 1842.

The conjoined white cord then descending with the vagus, seems to pass principally into the recurrent nerve, and probably sends filaments into the œsophageal branches.

Mr. Spence, whose dissections agree nearly with those of Bendz, proposes for the separated white cord of the vagus the name of the motor column of the vagus, (motor *root* would perhaps be better,) and likens its arrangement to that of the motor root of the fifth nerve, passing under the Gasserian ganglion, and joining the trunk beyond it. The pharyngeal branch of the vagus and the recurrent laryngeal being thus given off from the internal branch of the accessorius and from a motor root of the vagus, their purely motor functions are sufficiently accounted for; and the experiments of Dr. John Reid, in which irritation of the roots of the vagus nerve produced movements of the larynx, are explained. It is still, however, not clearly explained why his experiments of irritating the accessorius within the skull did not (as those of M. Longet did,) produce movements of the same organ. It is possible that all the filaments of the nerves were not implicated in the irritation.

A confirmation amounting almost to proof of this view of the influence of the nervus accessorius in the movements of the human larynx, is afforded by the fact, that according to Professor W. Vrolik,* the internal branch of the nervus accessorius in the chimpansé does not join the vagus, but goes at once and separately to the larynx, while the external branch is distributed almost exclusively to the trapezius And other facts confirmatory of the same view are supplied by the experiments of Signor Morganti;† which also tend to show that the external branch of the accessorius contains the fibres which have their origin lowest down on the cord, while the internal branch contains those which arise higher up, just below the vagus, of which the author considers the accessorius to be the anterior root.

Spinal nerves. Mr. Viner Ellis‡ has described minutely the arrangement of the posterior branches of the spinal nerves. Within the extent of the multifidus spinæ muscle, including therefore all the spinal nerves, except the suboccipital and the last two sacral and the coccygeal, all the posterior divisions of the spinal nerves have an external and internal branch. Of the cervical nerves the external branches supply the cervicalis ascendens, transversalis colli, and trachelo mastoid muscles; the internal and larger branches supply the multifidus spinæ, semi- and inter-spinales, and those of the four highest give off cutaneous branches. Of the posterior divisions of the dorsal nerves the internal branches penetrate the multifidus spinæ and semispinalis, and give cutaneous nerves from the six upper; the external branches enter the erector spinæ and levatores costarum, and cutaneous portions spring from about the six lower. In the lumbar nerves the internal branches of the posterior divisions end in the multifidus spinæ, and the external branches, giving cutaneous nerves from the three upper, terminate in the erector spinæ. In the three upper sacral nerves the internal branches enter the multifidus spinæ, the external and larger become cutaneous after uniting by anastomotic arches with each other and with the external branch of the last lumbar and fourth sacral nerves.

Sympathetic nerves. Dr. A. Von Walther§ has made experiments in which (after exposing them from behind) he has divided upon the front of the spine, near the sacrum and close to the aorta, some four or seven filaments passing from one of the trunks of the sympathetic nerve to the ischiatic plexus. (The mode of separation is accurately described.) The nearly constant result was, that after two days the capillary circulation on the operated side became more rapid, the capillaries smaller, and the blood-corpuscles in them disproportionately few. This lasted till about the fifth day; then for a day the circulation became natural, and then it

* Recherches d'Anatomie Comparée de Chimpansé, p. 40.

† Gazette des Hôpitaux, Août 17, 1843; analysis of an article in the Annali Univ. di Medicina.

‡ Medical Gazette, February 10, 1843. § Müller's Archiv, 1842, Heft v.

became slower and pulsatile, and gradually ceased. The blood-corpuscles accumulated in the larger vessels in spots, exudation took place, and the membrane of the web became soft and rotten.

With one exception in many experiments these changes occurred on only the foot of the injured side; yet, ingenious as they are, there must be much doubt as to the sufficiency of these experiments to prove the influence of these sympathetic nerves upon the irritation of the limb. The mere injury of the other nerves of that side would produce some effect, especially in animals tied down for fourteen or more days.

Dr. Fäsebeck* finds a sublingual ganglion between the myloboideus muscle and the sublingual gland, about two lines from the lower border of the latter. It is a round, flat, grayish-red swelling, about a line in diameter, and receives branches from the lingual branch of the fifth, from the chorda tympani, and from the filaments of the plexus around the sublingual artery. There proceed from its anterior and inferior part six branches, which penetrate the sublingual gland, and of which one accompanies the duct. He describes also six ganglia, each from one to three lines in diameter, between the lower part of the trachea and œsophagus, and between the latter and the spine, formed on branches of the sympathetic, vagus, and recurrent nerves, and giving filaments to the cardiac plexus, aorta, pulmonary artery, thoracic duct, superior cava, trachea, œsophagus, and pericardium.

SPECIAL SENSES.

Eye. Dr. W. Clay Wallace† has described two new muscles of the eye, to which he has assigned the function of adjusting the focal length of the organ for viewing distant and near objects. They resemble crescents, the horns of which meet at the equator of the eye, and they surround the gray cellular matter connecting the ciliary processes. Their fibres are radiated, and their colour like that of the muscles of the frog's leg. The trunks of the ciliary arteries pass the muscular fibres at the junction of the crescents, and are therefore not affected by their contraction; but the veins pass directly under the muscles and are compressed at each act of contraction. Supposing therefore that the eye is adjusted to a remote object and suddenly directed to a near one, an indistinct image of the latter is formed on the retina. The impression of this image is, Dr. C. Wallace thinks, communicated to the sensorium, and by a reflex impression through the third and fifth (?) nerves the muscles around the ciliary processes are made to contract; the veins of those processes being thus compressed they become erect, and their apices which float in the aqueous humour are elongated; these apices being attached to the anterior wall of the canal of Petit, draw it forward and with it the crystalline lens, till a distinct image of the object is formed on the retina. The return of the crystalline to its place is effected by the relaxation of the muscles, the emptying of the veins, and the elastic retraction of the tissue of the vitreous humour.

The description just given of the muscles is from the eye of the ox: in man they form not two crescents, but an entire ring.

According to Dr. Power,‡ the nervous fibres proceeding from the optic ganglia to the retinæ in the loligo, cross each other's course: those from the back part of the ganglia pass on to the anterior part of the retina, and *vice versâ* the bundles interlacing in the most perfect manner, and like the crossing of the fingers of both hands, passing between one another from one side of the ganglion to the opposite side of the retina. Led by this to the examination of the same nerves in higher animals, he found that a similar arrangement existed in all which he examined; in all, either by interlacement or by a half spiral turn, all the filaments which at its origin are in the upper part of the optic nerve, become near its retinal end inferior, so that the inferior filaments of the retina correspond to superior filaments in the brain.

* Müller's Archiv, 1842, Heft v. † Medical Gazette, Dec. 16 and 23, 1842.
‡ Dublin Journal of Medical Science, January, 1843.

He believes that this arrangement accounts for erect vision, although the impression of an object on the retina must be reversed. And if the observations be true, it is probably not necessary to look further for the explanation of this controverted question.

GENERATION.

Testicles. Mr. Gulliver* has confirmed R. Wagner's observation, that the general enlargement of the testicles which takes place as the period of procreation approaches is accompanied by enlargement of the individual seminal tubes. During winter he finds that the seminal tubes of birds are tolerably thick and strong; but at the season of procreation semen accumulates in them, and their coats are so distended and attenuated that they are very easily ruptured. The same thinning and enlargement of the tubules occurs in the development of the human testicles at puberty.

An interesting case, proving the sympathy of the vital organs with the testicles, is recorded by Dr. Schlesier.† A healthy man engaged in a fray in the dark, was suddenly heard to shriek out: he fell in convulsions and died in five minutes. On examination the only injury found was the rupture of both the spermatic arteries and veins at the internal rings, produced by the scrotum and testicles having been seized and pulled down by one of those with whom the man was fighting.

Spermatozoa. Facts of much importance in regard to the formation of spermatozoa are furnished by the cases first recorded by Mr. Liston and Mr. Lloyd,‡ and since repeatedly observed, in which these bodies are found in the fluid of common hydrocele of the tunica vaginalis testis, and in encysted hydrocele.

Uterus. In an appendix to his former papers on the nervous system of the uterus, Dr. Lee§ has published a further and very elaborate account of his dissections. The description is not such an one as can be here condensed, but in referring to his original papers, I may be allowed to state, that an examination of the preparations which I have been recently permitted to make, has convinced me that Dr. Lee's account and delineations of them are accurate and complete, and that there can be no reasonable doubt that the structures which he has displayed, are, as he describes them, the nerves and nervous ganglia of the pregnant uterus.

Ovum—its development, discharge, &c. The Report of Mr. T. Wharton Jones 'On the Ovum of Man and the Mammifera,' inserted in the last number of this Journal, is so complete to the time of its publication, that little need be now said on this department of physiology. I shall only state at greater length the conclusions recently arrived at respecting the escape of ova independently of fecundation, and the connexion of this occurrence with menstruation, which Mr. Wharton Jones was obliged to compress within the limits of a postscript. Many of these conclusions have been long held on insufficient grounds: those which may now be deemed established are as follows:||

* Proceedings of the Zoological Society, July 26, 1842.

† Casper's Wochenschrift, Oct. 22, 1842.

‡ See their respective papers in the Medico-Chirurgical Transactions, 1843, vol. xxvi.

§ Philosophical Transactions, 1842, part II.

|| The honour of priority in ascertaining many of the facts in these questions has been disputed both here and in France. Being neither willing nor able to decide in such a case, I shall only refer in one note to all the sources in which the recently-adduced facts themselves and the claims of the several candidates for honour may be found:—Dr. Robt. Lee, Lecture in the Medical Gazette, Nov. 4, 1842; Mr. Girdwood, Lancet, March 4, 1843; letters by various contributors, in the following numbers of the same journal; papers by M. Raciborski and Professor Bischoff, in the Comptes Rendus des Seances de l'Académie des Sciences, the Gazette Médicale and l'Expérience, July and August, 1843; Duverney, in the two last-named journals; Pouchet, in the Gazette Médicale, August 19, 1843, in an analysis of his work called Théorie Positive de la Fécondation des Mammifères.

1. Each act of menstruation is connected with the maturation and discharge of an ovum. Numerous cases in proof of this are related (in addition to those formerly recorded by him, and by MM. Gendrin, Negrier, and others,) by Dr. Robert Lee; others by Mr. Girdwood. M. Raciborski has four times found that ova had been recently discharged from the ovaries of virgins who died at or near the period of menstruation; and Bischoff has also four times found Graafian vesicles, containing effused blood, in girls who had recently menstruated.

This menstrual discharge of an ovum is said by Raciborski and Bischoff to be followed by the formation of a corpus luteum, similar to that which is formed when the ovum is impregnated and developed. [But in this I have no doubt they are mistaken. If it were so, one or more corpora lutea should be found in the ovaries of all who die while the habit of menstruation continues; for the *corpus luteum* which forms when impregnation has taken place, is distinct not only through the pregnancy, but for more—often much more—than a month after delivery. Neither are the cavities which are left after the menstrual discharge of ova, or the processes by which they are closed, at all similar to those found when impregnation has taken place. In many examinations of ovaries I have not yet seen a case in which, without impregnation, anything has been found which could be mistaken for a *corpus luteum* formed after an ovum has been discharged and impregnated.] Mr. Girdwood believes that the cicatrices left after the discharge of menstrual ova may be counted, so as to indicate the number of ova discharged and the number of times of menstruation. [But recently I have examined a case in which a girl of seventeen had not menstruated for four months before her death, but previously had menstruated regularly: the ovaries showed no traces of cicatrices. Probably, therefore, the cicatrices remain for a time distinct, but are gradually obliterated, as they are in the nearly analogous case of the discharge of the Peyer's and solitary glands of the intestines.]

3. The menstruation of women, in so far as the periodical maturation and discharge of ova is concerned, is analogous to the *heat* or *rut* of animals. The phenomena, according to Raciborski, may be most distinctly seen in the sow; but in all the domestic mammalia at their period of heat one or more follicles attain their highest degree of development, project upon the surface of the ovary, and at length burst with hemorrhage into their containing cavities, and this whether copulation have taken place or not. Bischoff also has repeatedly found the same things occur in bitches and rabbits whose uterus and tubes have been extirpated: they have heat, the ova mature and detach themselves and pass into the remaining portion of the tube, but of course cannot be impregnated.

4. The discharge of the ova and their passage along the tubes is independent of impregnation and the passage of the seminal corpuscles. This is evident from the facts already mentioned; and others are furnished by Bischoff. In one experiment he kept a bitch carefully secluded till the period of heat ensued. She then copulated once, and immediately after he extirpated the left uterine horn, ovary, and oviduct. The copulation had lasted a quarter of an hour; and he found that the semen had penetrated to the upper angle of the uterine horn, but not into the tube. He found also five ova in the oviduct more than two inches from its abdominal orifice; a distance sufficiently great to prove that they had not been detached in the copulation. Next day he killed the bitch, and found that spermatozoa had reached about a quarter of an inch in the right tube; he found also five ova in the same tube, and as many *corpora lutea* in the right ovary, but none of the spermatozoa had come in contact with the ova. These cases proved the detachment of ova before copulation. In some others Bischoff found that they were not detached till long after the act. In some he found that they were undetached twenty-four hours after copulation, and that the seminal corpuscles had passed on towards them. In others also he found the independence of the passages of the ova and the semen still more marked; for example, several days after copulation, ova were found fecundated in one tube, but in the other sperma-

tozoa alone, none of the Graafian vesicles in the corresponding ovary being either enlarged or fully developed.*

5. Thus, according to the period of heat at which copulation takes place, will be the place at which the semen meets the ovum. If it be early, the ovum may not escape before the semen reaches the ovary; if late, the ovum may have arrived at the uterus; and probably if it have arrived at the lower or uterine third of the tube before it comes in contact with the semen, impregnation is impossible on account of the changes which the vitellus has already undergone. In women it is in like manner near the period of menstruation that impregnation is most likely to occur. It may take place just before menstruation if the ovum be just mature when the semen reaches the ovary; or some days after, the ovum after its discharge remaining impregnable till the semen reaches it. Or, again, as many analogous circumstances in lower animals prove, an ovum may by the sexual excitement be hurried on to its muturity and discharged; and so, in unusual cases, impregnation may take place at a greater than usual distance from the menstrual period. Still the most common time must be, as common observation shows it is, either during or very near the menstrual period. M. Raciborski has found that in one hundred women there are not more than six or seven in whom this is not the constant rule.

6. All these circumstances prove a closer analogy than was supposed to exist between the discharge of the ova of mammalia and those of the fish, batrachia, and others in which the ova are discharged from the body and impregnated external to it. In all alike the discharge of the ova is an independent act; the differences are in the distances from the ovaries at which the semen is usually brought into contact with it.

Dr. J. E Panck† has published an essay on a case in which he believes that he has made the discovery of the organic connexion between the fallopian tube and the ovary of the human female soon after connexion. A girl, twenty-three years old, was suffocated by carbonic acid five days (it was supposed) after her first conception. There were signs of turgescence about all the uterine and ovarian vessels; the uterus itself was large and vascular, and thickly lined by mucus like a decidua and by ciliary epithelium-cells. On the right side the fallopian tube was turned backwards, and its fringe was expanded over the ovary. They were held together by a fine transparent membrane, which extended over them, over the posterior surface of the uterus and right broad ligament, and a little over the left broad ligament, and was slightly adherent to them all. The left tube and ovary were natural; the right ovary was large and vascular. Directly below the attached fimbriæ there was a cavity in the right ovary, like a distended Graafian vesicle, covered only by serous membrane, about three lines in diameter, and containing a blackish substance like clotted blood. But neither in this nor any where else was an ovum found; so that the evidence of the case is far from complete.

Formation and structure of the membranes, &c. M. Serres,‡ in a paper read

* These facts bear on the question of the possibility of a woman conceiving by two different men; and I find a recent notice of a case, often referred to, of a negress who having, as it was believed by herself and others, conceived twice in the same night, first by a negro and afterwards by a European, bore twins, of which one was a pure negress the other a mulatto. Dr. Hille, a Dutch military surgeon in Surinam, where the delivery occurred, adds that the children were living in 1841, that they were eight years old, that the black child, which was at first the strongest of the two, remained so, and that the mother had died some time previously, and on examination was found to have normally formed genital organs. (Casper's Wochenschrift, Jan. 28, 1842)

† A full account of the supposed discovery is in Casper's Wochenschrift, Mai 27, 1843.

‡ See the Gazette Médicale and contemporary French journals, Juin et Julliet, 1843. MM. Maignien and Jacquart have since published a case (Gazette Médicale, Novembre 4, 1843,) which confirms, they think, M. Serres' view of the amnios. They found in an early aborted embryo an amniotic vesicle fixed to the chorion by a narrow pedicle, near

before the Institute of France, and in subsequent discussions, has maintained the view of Pockels, that the embryo is outside the amnios to the fifteenth or twentieth day, and that the amnios up to this time is a free vesicle, in which the embryo dips and envelopes itself (exactly as the ovum is supposed to envelope itself in the decidua) in a double sac. He adds, further, his belief that the allantois of the human embryo, having its pedicle immediately in front of the caudal prolongation, and at a distance from that of the umbilical vesicle, cannot be regarded as produced by a retroversion of the intestine, but has its origin in the corpora Wolffiana, whose existence in the human embryo he considers he has fully demonstrated. His view was supported by preparations, but in the discussions which followed the reading of the memoir, MM. Coste and Velpeau maintained each his own previous view of the matter, and said that the preparations did not demonstrate that of M. Serres.

Mr. John Dalrymple* has described and figured the minute vessels of the vitelline membrane and allantois of the chick. Of the vitelline membrane he says that immediately around the remains of the vitelline area are seen on the internal surface of the yelk-sac the commencement of a series of radiating folds, which as they advance dip deeper and deeper into the interior of the sac, and separate more widely from each other. When the vitelline cells are completely removed it is seen that vessels alone constitute the framework of these folds, the large trunks forming their bases, while innumerable lesser branches dip deep into the interior of the sac, inosculating repeatedly, and terminating in a series of very tortuous branches, which fringe the extreme edge of each fold. Numerous simple loops are observed shooting from the sides of the larger trunks; and if we conceive each trunk and every small vessel thickly covered with an aggregated arrangement of vitelline globules or nucleated cells, which conceal the vessels and colour them bright yellow, we shall have a true idea of the appearance of these folds previous to the manipulation necessary to display the injection.

In the allantois Mr. Dalrymple says there is a very minute distribution of equal-sized capillary vessels throughout its inner layer, forming an uniform vascular surface covering the large trunks as well as the interspaces of their divisions; and the anastomoses of the capillaries are so numerous and close that the areas they leave do not exceed the diameter of the vessels themselves. From the similarity of this arrangement of vessels to that found in the lungs of the frog, salamander, &c., he thinks evidence may be adduced for the supposed respiratory function of the allantois.

Mr. F. Renaud,† confirming (as nearly all now do) E. H. Weber's description of the arrangement of the vessels of the placenta, points out as a chief source of fallacy in the examination of these structures, the rapidity with which the villi of the chorion absorb water, and are distended and confused by it.

M. Elsaesser‡ has found in 144 fœtuses either born dead or living only a month, that in fifty-two born dead (of which forty-eight were mature and four immature), the ductus arteriosus, ductus venosus, and foramen ovale were all open forty-eight times. In four (one immature) the for. ovale was closed, the others open.

In ninety-two dying in the first four weeks (of which twenty-two were premature) all the passages were open in fifty-eight. In eighty the foramen ovale was open; in seventy-seven the ductus arteriosus; in sixty-five the ductus venosus.

The most common mode of closure is: 1. The ductus venosus, beginning at

which was the embryo, rather more than a line in length, free at its cephalic extremity, and adhering to the amnios only by its caudal extremity and the inferior part of its dorsal surface.

* Transactions of the Microscopical Society of London, vol. i, 1842.

† London and Edinburgh Monthly Journal of Medical Science, March, 1843.

‡ Henke's Zeitschrift, t. xlii, and Archives Gén. de Médecine, Juillet, 1843. In a later paper (Henke's Zeitschrift, B. iv., No. 42,) M. Elsaesser has given accurately the lengths and weight of 1000 children born at the full period; but in such a form, that no abstract is possible.

the vena portæ. 2. The ductus arteriosus beginning at the middle. 3. The foramen ovale by the application of its edges. Even later than four weeks any of them may sometimes be found partially open.

LACTATION.

M. Mandl* confirms the view of Henle and others in regard to the perfect milk-corpuscles, proving the existence of an external membranous envelope by rubbing the corpuscles between glasses. The oil-globules are set free, and the torn membranes are unrolled and flattened.

M. Raciborski† has examined the question of the influence of menstruation on the secretion of milk, and has found that it is unimportant. The only difference between the milk of nurses who do, and those who do not menstruate, is that in the former the proportion of cream is rather less in the menstrual period than it is in themselves in the intervals, and than it is generally in non-menstruating nurses.

PHYSICAL HISTORY OF MAN.

Characters of the Egyptian and Negro races. Dr. S. G. Morton‡ has made observations on one hundred crania of ancient Egyptians, obtained at seven sepulchral localities from Memphis in Lower Egypt to Deboud in Nubia. He classes them as 1. *Arcto-Egyptians*, including the purer Caucasian nations, as seen in the Semitic tribes of Western Asia, and the Pelasgic of Southern Europe. 2. Austro-Egyptians, in which the cranium blends the characters of the Hindoo and Southern Arab; which people, the author thinks were ingrafted on the original population of Ethiopia, and thus gave rise to the celebrated Meroite nations of antiquity. 3. Negroloid, in which the osteology of the crania corresponds to the Negro; but the hair, though harsh, is long and smooth, like the present Mulatto grades. 4. Negro.

The lines between these could not be exactly drawn. But in the one hundred skulls there might be reckoned fifty-six Arcto-Egyptians, twenty-eight Austro-Egyptians, six Semetic, seven Negroloid, one Negro, and two doubtful.

He deduces, therefore, 1. That Egypt was originally peopled by the Caucasian race. 2. That the great preponderance of heads like those of the purer Caucasians suggests that the valley of the Nile derived its primitive inhabitants from one of these sources. 3. That the Austral-Egyptian or Meroite communities were in great measure derived from the Indo-Arabian stock; thus pointing to a triple Caucasian source for the origin of the Egyptians, when regarded as *one people* extending from Meroe to the Delta. 4. That the Negro race exists in the catacombs in the mixed or Negroloid character: that even in this modified type their presence is comparatively unfrequent; and that if Negroes, as is more than probable, were numerous in Egypt, their social position was chiefly in ancient times what it now is,§ that of plebeians, servants, and slaves.

Stature. Some very interesting observations on the stature of man have been made by Mr. A. Shaw.|| He shows that rickets not only produces softening of the bones but arrests growth; and this in the lower extremities much more than the upper, so that the child-like form, characterized by largeness of the head, trunk, and upper extremities is persistent. These three parts are in persons stunted by rickets reduced only by 1-13 of the natural size; but the pelvis and lower extremities are reduced by 1-3. There is, therefore, an *arrest of development* in regard to proportion of form.

This is shown further in that the proportion of size between the cranium and face remains as in childhood; the former being always *proportionally* large, though

* Anatomie Microscopique, livre ix, and Bulletin de l'Académie Royale de Médecine, 1842, p. 1157.

† Bulletin de l'Académie Royale de Médecine, Juin 15, 1843.

‡ On the Form of the Head, and other Ethnographic Characters of the Ancient Egyptians; in the Proceedings of the American Philosophical Society, Nov. 1842.

§ In America.

|| Medico-Chirurg. Trans. vol. xxvi, p. 336.

absolutely not so large as in the well-formed adult. The proportions are in the child as 8:1; in the well-formed adult as 6:1; in the rickety adult as $7\frac{1}{3}$:1.

On the other hand, where growth is preternaturally active, as in giants, the lower half of the body is the part which is most increased, and it acquires disproportionate length. And in these, the cranium, though absolutely large, is, relatively to the face, small; e. g., in the skull of O'Byrne, the giant eight feet high, in the museum of the Royal College of Surgeons, the proportion of the size of the head to that of the face is only as five to one.

Varieties of the pelvis. Dr. Knox,* in his "Contributions to Anatomy and Physiology," shows that many or all the national peculiarities of the form of the female pelvis, as well as many of those which are regarded as malformations, are to be regarded as due to the fœtal form of the pelvis being more or less persistent. The fœtal form "is more quadrilateral than oval or rounded, and its antero-posterior diameter is the longest: it has the form, in great measure, of the pelvis of the quadruped and quadrumanous mammal, of the human male generally, and of certain ill-formed human female pelves." When the persistence in this form exists on one side only of the pelvis, it produces the *pelvis obliquè ovata* of Naegele. Its more common effect when existing on both sides is to produce the not unfrequent narrow quadrilateral form of female pelvis; but when it exists in an extreme degree on both sides, it may produce, as in a pelvis in Dr. Outrepont's collection, a kind of a double Naegele's oblique pelvis—one with a very long conjugate diameter, but very narrow in front—almost like a seal's pelvis.

He gives cases also of relaxation of the ligaments of the symphysis pubis in delivery.

Age of puberty in girls. Mr. Roberton† of Manchester, in continuation of some former papers, the object of which was to prove that the age of puberty is as early in the cold as in the tropical regions of the earth, and that the early fecundity in Hindostan and other warm countries is only the consequence of early marriages, proceeds now to show, that in all countries alike, early marriages (and early fecundity) are always connected with moral and political degradation, as exhibited in bad laws and customs, the enslavement more or less of the women, ignorance of letters, impure and debasing systems of religion; and that they bear no relation to the climate of the country.

His evidence is extensive and very interesting; and the conclusions he arrives at are, 1. That in England, Germany, and Protestant Europe in general, early marriage, i. e. marriage about the age of puberty, is comparatively rare. 2. That early marriage prevails among the uncivilized tribes within the arctic circle, as it likewise does in *all* cold countries, the inhabitants of which are in a state of ignorance and moral degradation. 3. That throughout European Russia, which is confessedly low in civilization, extremely premature marriage was the universal custom at no distant date. 4. That at the present day, in the most southerly countries of Europe, where the people are immersed in superstition and ignorance, marriage is early. 5. That in Ireland, which as to its moral condition somewhat resembles the last-mentioned countries, the marriage union takes place among the Roman Catholic population almost as early. 6. That in England, about two centuries ago, when debasing political and social circumstances combined to favour the practice, early marriages were general, at all events in the upper ranks. 7. That in all the countries to which reference has been made, juvenile marriage is invariably seen as an attendant upon ignorance and moral debasement, and this without reference to *climate*. 8. That consequently it is allowable to infer that early marriage in oriental countries (which has generally, but without any proof, been ascribed to precocious puberty,) depends solely on the same moral and political causes as produce it elsewhere; more especially as those very causes are well known to exist at present in an aggravated degree in all oriental and intertropical countries.

* Medical Gazette, July 21 and following numbers, 1843.
† Edinburgh Medical and Surgical Journal, Oct. 1832 and July 1842.

These conclusions are probably in a great measure true; yet that the commencement of menstruation and of fecundity does bear some relation to the latitude and average temperature, appears to be proved by the following table, in which M. Raciborski gives his results as to the average age at which menstruation commences in different countries and towns:

Name of Town.	Latitude.	Age at first menstruation.	Mid. Temp. of the year.	No. of Observations.	Observer.
*Toulon	43° ...	14·081 ...	15·° ...	43 ...	Marc d'Espéne.
†Marseilles	43 ..	14·015 ...	15· ...	25 ...	Ditto
†Lyons	46 ...	14·492 ...	11·6 ...	160 ...	Bouchacourt.
Paris	49 ...	14·465 ...	10·6 ...	200 ...	Raciborski.
Göttingen	52 ...	16·038 ...	8· ...	137 ...	Osiander.
Warsaw	52 ...	15·083 ...	9·2 ...	100 ...	Lebrun.
‡Manchester	53 ...	15·191 ...	9·6 ...	450 ...	Roberton.
Skeen	59 ...	15·450 ...	6· ...	100 ...	Faye.
Stockholm	59 ...	15·590 ...	5·7 ...	102 ...	Wistrand.
§Swedish Lapland	65 ...	18· ...	4· ...	...	Wretholm.

In general, therefore, the period of puberty is later in nearly the same ratio as the latitude is higher: for each degree of the one the other is retarded about a month and a few days. And the lower the latitude, the more frequent are the examples of precocious appearance of menstruation.

A still more exact relation is between the date of first menstruation and the mean year's temperature; as may be seen by comparing Warsaw and Göttingen, Göttingen and Manchester, &c. M. Raciborski adds that *race* often determines the period of first menstruation. The children of negroes born in England menstruate as early as their parents; those of Europeans born in India as late as their parents. To determine how far circumstances of climate could countervail the influence of race, M. Raciborski obtained information respecting the period of menstruation in Jewesses in Poland, from M. Lebrun, médecin-en-chef of a hospital in Warsaw, and found the mean period in Catholics 15·83, in Jewesses 15·89; (100 observations of each race;) showing that the influence of race remained after ten or more centuries. And in like manner the menstruation ceases sooner in Polish Jewesses than in Sclavonian women, lasting in the former on an average $29\frac{18}{33}$ years, and in the latter $31\frac{6}{33}$ years.

There is a difference also, dependent, probably, on numerous causes, between the women of Paris and those of villages a league and half or two leagues from Paris, though both have a similar soil, temperature, &c. In the villages the average age at first menstruating is 15·020 years, in Paris 14·465.||

M. Raciborski¶ has also published an account of the age at which menstruation ceases. At Lyons the average age is between 45 and 50; at the Slp ètrière, in 100 women, the average was 46·03: at Warsaw, 47·05; at Christiana, 48·07. As a general rule, the greater the number of children borne, the longer is the continuation of menstruation; and the earlier the commencement of menstruation, the greater the number of children and the later the cessation.

Changes in age—Varia. A remarkable example of vigour in most advanced age has been observed in M. Rochard, a musician, 107 years old, on whom Mr. Cæsar Hawkins successfully operated for strangulated hernia.** The hernia had

* Archiv. Gén. de Méd. 1835.
† Dict. des Sc. Méd. 2me edit. 'Menstruation.'
‡ Edinb. Med. and Surg. Journ. Oct. 1832.
§ Eighteen years is only a general statement, it should probably be less.
|| A. Raciborski 'De l'Epoque de la Pubèrté,' &c., L'Expérience, Juillet 26, 1843, and many subsequent numbers. Numerous facts bearing on this and similar questions may be found in Brierre de Boismont, 'De la Menstruation,' &c., Paris, 1842, reviewed in vol. XIV, Oct. 1842.
¶ Medical Gazette, Dec. 9, 1842.
** L'Expérience, Octobre 26, 1843.

been strangulated upwards of thirty hours: the wound united by the first intention, except where two ligatures hung out, and in a fortnight after the operation the old man was as well as before it. He has since died.

M. Ruelle,* of Cambrai, has recorded an example of precocious virility. A child, three years and a quarter old, muscular and strong as one of eight, has all his male organs of the full adult size, with long black hair on the pubes, and under excitement discharges semen four or five times daily. He has also a full male voice, and dark short hair on the cheek and upper lip.

A contribution to the knowledge of the effects of the air at great heights in the atmosphere, and a confirmation of most of the results which have been already obtained are furnished in the observations made in an account of an ascent of the 'Grosse Venediger,' a mountain upwards of 11,000 Austrian feet high, in the southern border of Oberpinzgau, by Dr. F. Spitaler † The party ascending consisted of forty persons, of whom twenty-six only accomplished the feat. The chief effects produced were, 1. On the respiration, which in all became rapid and difficult, and was greatly hurried in exertion, and in some amounted to agony, so that from mere dyspnœa they were compelled to return: one also had slight hemoptysis. 2. On the pulse, which became small and weak. 3 On the secretion of urine, which was remarkably diminished, so that among the whole forty persons, during between eight and nine hours' walking in a temperature only just above freezing point, urine was passed only nine times. 4. On the cutaneous exhalation, which (though the invisible evaporation was probably much increased,) did not once appear as sweat. 5. On the heat of the body. All had the sensation of intolerable cold, though actively exerting themselves and well clothed, and though the temperature was 4° or 5° R, and the weather nearly calm. This was felt, however, only when they had ascended above 9000 feet: below it, although the temperature was not higher, the sensation of cold was far less painful. 6. On the muscular power, which was, in all the party after they had nearly attained the height of 1000 feet, exceedingly prostrated. Some were from utter fatigue obliged to give in; some could not even stand, and of those who went on none could walk more than twenty or, at last, more than ten steps without stopping to rest. In some these signs were accompanied by ringing in the ears, in some by nausea and even by vomiting, in some by utter carelessness of life; not one reached the summit except in a state of complete exhaustion. And all this was far from being the kind of fatigue consequent on extraordinary muscular exertion; for several of those who could not attain the summit and of those who did so only with difficulty descended in good plight and walked on for many hours with scarcely a complaint of weariness.

The influence of the increased brightness of the sun's light was very marked. The clear, deep blue of the most beautiful southern sky was far surpassed in beauty; and though all the party wore dark shades or veils, all suffered from pain and inflammation of the face and eyes and of every part which was at all exposed to the action of the sun.

Dr. D. D. Owen‡ has given a detailed account of the impressions of two human feet found on the surface of a slab of limestone, from the specimen described by Mr. Schoolcraft in 1822, and by Dr. Mantell in his 'Wonders of Geology.' The slab of limestone was taken from a rock which was exposed at the very margin of the Mississippi, opposite St. Louis, but only during very low water, such as does not happen more than once in ten years. It is a solid mass, upwards of a ton weight, of a purple and grayish tint, containing numerous shells, species of producta and pentromytes. The impressions are so exactly like those of feet set upon a soft mud, that it is difficult to imagine that they can be a work of art; yet Dr. Owen thinks the difficulties of this hypothesis less than those of that which ascribes to them an existence before the limestone had hardened.

* Bulletin de l'Académie de Médecine, Févr. 28, 1843.

† Oesterreichische Med. Jahrbucher, Oct. 1843. A summary of nearly all the observations on this subject is given by M. Rey, in the Revue Médicale, Oct. 1842.

‡ American Journal of Science and Arts, July, 1842.

The contents of the following papers have considerable interest, but are not of a kind which could be introduced into the Report:

Mr. Sibson's observations "On the relative positions of the thoracic and abdominal viscera," of which an abstract is given in the Lancet of August 12, 1843, and the Provincial Medical and Surgical Journal of the same date. Dr. Laycock's papers "In proof of the existence of a general law of periodicity in the phenomena of life," in the Lancet, October 22, &c., 1842. Mr. Ancell's "Commentaries on the works of Liebig," Lancet, November 13. &c., 1842. Papers by M. J. Parise in the Archives Générale de la Médecine, Juillet et Aôut, 1843, "On the apparent changes in the length of the lower extremities in changes of their position in regard to the pelvis." Numerous papers "On comparative and transcendental anatomy," by Dr. Knox, in the Medical Gazette. Dr. Willis's papers on the "Physiology of the skin and the lymphatics," in the Proceedings of the Royal Society March 9, 1843, and in the contemporary journals. Dr. Golding Bird's paper "On the microscopic globules found in urine," in the Guy's Hospital Reports. Mr. Gulliver's observations "On the frequency of fatty deposits in the degenerations of the tissues of old persons," in the Medico-Chirurgical Transactions, vol. xxvi. J. von Berres, Erfahrungen über die Zeugung, in the Oesterreichische Jahrbucher, April to September, 1843.

PART FOURTH.

Medical Intelligence.

New Charter of the College of Surgeons.

The following is an abstract of the provisions of the new charter of the College of Surgeons, freed from legal verbiage and technicalities. We append a few remarks which naturally suggest themselves on the examination of this important document.

1. The name of the College is changed to that of The Royal College of Surgeons of England.
2. The future members are to consist of two classes, Members and Fellows.
3. Members are to be admitted precisely as heretofore, after an ordinary examination, and at any age not less than twenty, and on paying the usual fee, (at present twenty guineas.)
4. Persons are admissible as Fellows after passing a special examination, and at any age not less than twenty-five. It is not necessary that the candidate for the Fellowship should previously pass the examination for a member; but persons having become members may present themselves for examination as fellows, on attaining the proper age.
5. The scholastic educational requirements and the nature of the examinations for candidates for the Membership and Fellowship, respectively, are not defined in the Charter.
6. There is no other restriction as to the attainment of the Fellowship, except those of age and passing the appointed examination. [Fellows consequently may practise pharmacy and midwifery at will.]
7. The number of Members and Fellows is unlimited.
8. Fellows have no special privileges beyond Members, except in having votes for the Members of the Council, and in being themselves eligible as Members.
9. The amount of fee to be paid by Fellows, on admission, is left to be fixed by the Council, but cannot exceed thirty guineas over and above the stamp duty on the diploma. [Whatever be the amount of fee fixed on for the fellowship, it is presumed that the sum previously paid by members for their diploma will be deducted from it.]
10. The Council is henceforth to consist of twenty-four Members (instead of twenty-one as at present,) to be elected from the Fellows by the Fellows.
11. All Fellows are eligible for the Council, except such as actually practise, or during the preceding five years have practised pharmacy or midwifery, or live beyond five miles from the London Post-Office.
12. Three Members are to retire from the Council every year, and their places to be filled up from the Fellows: the retiring members to be immediately re-eligible.
13. The election of Councillors is to be by ballot of the Fellows present at the meeting, fifteen to be a quorum, and the election to be decided by a simple majority of votes.
14. At the election of Councillors, Fellows must be proposed in the order of their seniority on the list; and every Fellow so proposed on two different occasions and not elected, shall not be again eligible.
15. The members of the Council in office at the time of granting the Charter are to continue such for life without re-election.
16. Until the Life-Members have all died off or retired, the annual supply of three new Members to the Council is to be effected by the retirement of the Members last elected.
17. The Examiners of candidates for the Membership and Fellowship are to be ten in number. They are to be chosen by the Council from the Fellows whether at the time members of the Council or not. They are to hold office during the pleasure of the Council. Six examiners are to be a quorum for examination. [The present Examiners are to continue for life.]
18. The President and the two Vice Presidents are to be chosen by the Council from among the Members of the Council, whether Examiners or not.

19. The new Charter confirms all the powers of the old, and bestows no additional powers, except such as are stated in the foregoing extract.

20. All by-laws and ordinances of the Council must be approved of by the Secretary of State before they are valid.

21. The Charter grants to the old Council the provisional power of nominating, and commands it to nominate, without examination or the payment of any fee, a certain number of Fellows from among the existing Members of the College, namely, not less than 250, nor more than 300, within three months from the date of the Charter, that is before the 14th of December, 1843; and authorizes it, but does not order it, to nominate other Members (the number not specified) to be Fellows, within the period of nine months after the 14th of December. After the expiration of the twelve months from the date of the Charter, Fellows can only be elected after examination and the payment of a fee as provided by the Charter.

22. The Council are ordered to keep a register of all the FELLOWS in the order of their seniority for the inspection of Fellows and Members. [This register, it is presumed, will contain also a list of MEMBERS, with the place of residence of both Fellows and Members, and will be published annually for their use.]

The first and most important remark that suggests itself in reference to this Charter, is, that its whole purport is to regulate the College as a simple corporate body, and that it does not confer on it one atom of power or a single privilege in relation to the profession. The new College, like the old, can give no licence to practise, possesses no control whatever over any class of practitioners, and can oblige no one to enter its ranks either as a Member or Fellow. All its privileges consist in its power to bestow a title on those who choose to seek it, according to certain regulations. The organization and government of the MEDICAL PROFESSION, therefore, are not at all interfered with by the provisions of the Charter, and await the enactment of the MEDICAL BILL, so long in preparation by Sir James Graham. It is, no doubt, unfortunate that the granting of this Charter was not deferred until after the passing of the bill; as the provisions of the Charter—which can only be regarded as a mere subordinate matter of detail—may be found to hamper the more important provisions of the general measure. The difficulty will be increased if the Physicians' Charter is also granted previously to the enactment of the Medical Bill. We hope, however, that although it will be more difficult to frame a liberal general law in perfect harmony with these Charters than it would have been to frame Charters in harmony with it, yet that the difficulty is not insuperable. Should this, indeed, prove to be the case, we doubt not that the author of the bill will not hesitate to get both Charters modified, rather than endanger the soundness of a measure on which the future welfare and prosperity of the whole medical profession will probably depend. Our object, however, at present being merely to offer a few comments on the new Charter, as a code of laws for regulating one of the most important corporate societies in the profession, we shall leave all consideration of the general subject until another occasion.

It will not, we presume, be doubted by any calm and impartial judge, that this Charter is a great improvement on the old. Some of its provisions certainly might have been improved; but, looking at it as it stands, we think the profession owes a debt of gratitude to Sir James Graham for insisting (as we believe he did) on its more liberal clauses; while it is, in many respects, creditable to the judgment of those Members of the College who were mainly instrumental in obtaining its enactment.

No man of experience need be told that it could be no easy task to bring a body of men, however honorable, in the actual possession of exclusive rights of long standing, of power and of property, and responsible to no one, to forego, in a great measure, their dearest privileges. And it were well that when we criticise the proceedings of such persons, we should reflect what might have been our own feelings, views, and conduct in similar circumstances. Examining the Charter in this spirit we must regard its provisions, on the whole, as good; and we think we may confidently expect from those who framed it, yet further improvements in its more liberal parts, if it should be found, in the working, to be injuriously restrictive of the legitimate rights and free action of the new constituency.

By the new Charter the system of monopoly and self-election is for ever abolished;

and it remains entirely with the future Members of the College whether the Council shall henceforth be such as they deem fit to represent and rule them. As by the new provisions, every member may claim to be admitted a Fellow on attaining the age of twenty-five; and as the election of the Council is left entirely in the hands of the Fellows, no apprehension need be entertained that the appointment of Councillors will be brought about by unfair means, or, consequently, that improper persons will be elected. The examination for the Fellowship will, of course, be of such a nature as any well-informed surgeon can pass—no Council would dare to make it unnecessarily severe—it cannot, therefore, be doubted but that the great majority of future Members will become Fellows, and thus a body of electors will always exist too large to be corrupted or seduced or "managed" in any way. Most important advantages will result from making the admission to the Fellowship through the door of a higher examination, and at a period subsequent to the ordinary termination of school studies. The men desirous of this honour—and, as we have said, we believe most members will be so—will take care that in the first instance they *study up to the mark* of the Fellowship; and that should they at first take the inferior degree of Member, they will *keep up* the knowledge then obtained, or even continue to improve it, until they reach the age for claiming the higher title. Had we been framing the Charter, we should have made the examination for the membership a strict one, and the only one, leaving admission to the Fellowship contingent on the attainment of a certain standing as Member—say seven or ten years—and the payment of a moderate fee. We, however, do not quarrel much with the present arrangement, and see in it some advantages over the other, the most important of which is that just stated. A more serious objection to the new Charter in the eyes of many will probably be the exclusion from the Council of practitioners of pharmacy and midwifery. In some respects we consider this as an important defect, more especially as regards the practitioners of midwifery. Although well aware that the progress of reform is not yet sufficiently advanced to justify any measure that would virtually forbid surgeons to practise pharmacy (that is, to send out their own medicines), we are still glad to see any enactment that tends to abolish this most impolitic, and, we may say degrading association of trade with science. And we entertain no doubt whatever that the clause excluding practitioners in pharmacy from the Council of the College, will eventually have a powerful influence in abating this crying evil. Unfortunately, however, the coupling of midwifery with pharmacy as joint causes of exclusion, will interfere most materially with the progress of this reform. General practitioners may, without difficulty, cease to supply their patients with drugs; but we cannot see how they can cease to attend cases of midwifery without such a sacrifice of their interests as must more than counterbalance even the honours and advantage of a seat in the Council. In our zeal for the abolition of the trade in physic, we would have almost consented to the exclusion of practitioners of pharmacy even from the Fellowship, provided this obnoxious and impolitic exclusion of practitioners in midwifery from the Council had been abandoned. After all, however, this can only be regarded as a minor evil; and sinks into insignificance when viewed in conjunction with the real and substantial advantages conferred by the Charter. We cannot doubt but that there will always be found in London and its vicinity enow of men in the class of pure surgeons (including many who have ceased to practise pharmacy and midwifery) from among whom the Fellows—that is, THE GENERAL PRACTITIONERS (*for the vast majority of Fellows will eventually be general practitioners*)—may choose fitting representatives and officers. It even will lie with themselves, hereafter, to obtain such modifications in the Charter as they may deem more to their own honour and advantage. Every general practitioner may become a Fellow if he please; and every Fellow may, even by the present Charter, render himself eligible for the Council: and it will go hard, if, with such potential vantage-ground, the majority should not be able to obtain the virtual, if not the ostensible supremacy in the direction of their own affairs.

The prescribed mode of electing members of the Council (see paragraph 14 of our abstract) seems to us, also, if not a positive defect, certainly of doubtful propriety. It, no doubt, obtained admission into the new Charter because it formed a prominent feature in the old,—of which, indeed, it is an improvement. The obvious and natural mode of proceeding, as it appears to us, would have been—to limit the eligibility to be members of Council, to Fellows of a certain standing—say ten years—and

then leave the selection to be made from this class, without any restriction as to individual seniority. And we cannot but apprehend that the reasonable desire on the part of the Fellows, to choose the men they may deem best qualified for the office of Councillors, may, in the working of this part of the measure, lead to results seriously affecting the harmony and respectability of the institution. We doubt not, however, that the more liberal members of the Council will take care, by great reserve in proposing the immediate re-election of retiring Members, not to compromise the rights or just expectations of those placed lower on the list. In this manner we think the clause in question may, in a great measure, be deprived of the danger of which it appears to us to be at least a possible source. With regard to this clause, however, as well as to others which may seem objectionable, we doubt not that the new Fellows will have sufficient judgment and discretion not to condemn it or them absolutely, until their value has been proved in actual practice, and on more than one occasion; as it will be much more for their interests to put up with inconveniences or evils for a few years, and then to have them permanently remedied, than to run the risk, by a hasty decision, of only exchanging one blemish for another. There was never yet a code of laws devised for the government of any institution which did not call for and receive subsequent alteration and improvement; and we have no right to expect that the new code of the College of Surgeons should differ in this respect from all its predecessors.

Viewed in relation to the great question of the nature of the Charter itself and its future working, it is a matter comparatively of trifling importance, whether the retained Life Members of the Council are well qualified or not, or whether in selecting the new Fellows they have exercised their privilege with impartiality and judgment. The evil, if it existed, would be soon abated by the great redressor of wrongs, Time. Alas, in the course of twenty or thirty years, where will be the great majority of the Life Members, of the Selected Fellows, and of Us who may be criticising them and their proceedings? Ere the expiration of that period, the great body of the Fellows will be those who had attained their station by right, and the Members of the Council will be of their own choosing, and directly or indirectly responsible to them. We are, therefore, little disposed to give heed to the short-sighted critics who may be able to show us some imperfections in this part of the arrangements. But the fact we sincerely believe to be—that the present Members of the Council will, with the new infusion of the Annual Three, constitute a good Council; and we have every reason to believe that they have exercised their privileges of selecting the new Fellows with sound discretion and impartiality. That the list should give universal satisfaction is not to be expected; but knowing, as we do, the men who are said to have been principally active in forming it, we shall be surprised if the names contained in it do not obtain very general assent from the profession.

We have reason to believe that the Council, in selecting the new Fellows, have had chiefly in view individuals coming under one or other of the following denominations:

1. Members of the present Council.
2. Surgeons of recognized hospitals.
3. Retired surgeons of recognized hospitals.
4. Practitioners in London who were regarded as eligible to the Council under the old system.
5. Medical officers of the army, navy, and East India Company's service, specially recommended by the heads of their department.
6. Practitioners in the country, not hospital surgeons, but having a high surgical reputation in their respective districts, and being of a certain standing in the College.
7. Other Members of the College, not included under the foregoing heads, but distinguished for their scientific labours or high professional eminence.

N.B. The first list of Fellows is limited to 300, and includes no one whose diploma as Member dates since March 1837. The supplementary list, to be published within twelve months from the date of the Charter, will contain the juniors and some others whose names were omitted for want of room in the first.

CHRONOLOGICAL SCHEDULE OF THE FELLOWS OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND. (*First List.* 300.)

John Goldwyer Andrews, London.
Sir Benjamin C. Brodie, Bart. London.
Samuel Cooper, London.
Honoratus L. Thomas, London.
Robert Keate, London.
John Painter Vincent, London.
George James Guthrie, London.
Anthony White, London.
Thomas Copeland, London.
James Briggs, London.
William Lawrence, London.
Benjamin Travers, London.
Joseph Swan, London.
Edward Stanley, London.
Joseph Henry Green, London.
Thomas Callaway, London.
George G. Babington, London.
Robert Liston, London.
James M. Arnott, London.
John Flint South, London.
John Morgan, London.*

Robert R. Pennington, London.
Alexander Ogilvy, London.
Richard H. H. Steel, Berkhampstead.
Thomas Nixon, Pepperwick
James Borland, Teddington
Sir Simon Heward, Knt., Carlisle.
John Gunning, Paris.
William Hey, sen., Leeds.
Robert Bloxham, Isle of Wight.
Richard Cartwright, London.
Thomas Beckett, London.
Stephen Woolrich, Bridgnorth.
James Annesley, London.
George Frederick Albert, Cheltenham.
Henry Parkin, Woolwich.
Thomas Kidd, Corfu.
Joseph Constantine Carpue, London.
Sir James Pitcairn, Knt., Cork.
Henry Coates, Salisbury.
Sir Stephen L. Hammick, Bt., London.
George William Young, London.
Joseph Langstaff, London.
John Smith Soden, Bath.
Charles Seager, Clifton.
William H. Crowfoot, Beccles.
William Percival, Sen., Northampton.
George Norman, Bath.
Samuel Dyer, London.
John Bacot, London.
Richard Wood, Birmingham.
John Harris, Exeter.
John Badley, Dudley.
Bowyer Vaux, Birmingham.
Sir John Chapman, Knt., Windsor.
William Attree, Brighton.
George G. Campbell, London.
George Langstaff, London.
Samuel Ludlow, Exeter.
Jonathan Toogood, Bridgewater.
Sir Augustus West, Knt., Paris.
Morgan Thomas, Woolwich.
Thomas Davis, London.
William Andrews, Salisbury.
James Dawson, Liverpool.
John Ridout, London.
John Augustus Knipe, London.
Vero Clarke Kemball, London.
John Wright, Derby.
Hugh C. Standert, Taunton.
Charles Farrell, Dalyston.
John A. Ransome, Manchester.
Robert Bickersteth, Liverpool.
Charles Boutflower, Liverpool.
Kenrick Watson, Stourport.
John Bishop Estlin, Bristol.
George Champney, York.
James Ainsworth, Manchester.
Andrew Brown, Paris.
Richard B. Godwin, Derby.
Harry Blaker, Brighton.
William Tuckwell, Oxford.
William B. Lynn, London.
John Grenfell Moyle, Cheltenham.
William Goodlad, Manchester.
James P. Sheppard, Worcester.
John North, London.
Robert Thorpe, Manchester.
Charles Wingfield, Oxford.
John Lawrence, Brighton.
Thomas Martin, Reigate.
Richard W. Brown, Bath.
Richard Blagden, London.
Charles Mayo, Winchester.
Gideon A. Mantell, Clapham.
Samuel Barnes, Exeter.
William Cother, Gloucester.
John Haddy James, Exeter.
John Nedham, Leicester.
Matthew Pierpoint, Worcester.
William Rae, Chatham.
Joseph Hodgson, Birmingham.
Samuel Smith, Leeds.
Henry Terry, Northampton.
Alfred Jukes, Birmingham.
John Clarke, Dumfries.
John Cooper, Liverpool.
William L. Thomas, Hatfield.
Charles H. Phillips, London.
John Baird, Newcastle-upon-Tyne.
Thomas Joseph Pettigrew, London.
William Jackson, Sheffield.
Robert Tayler, Brighton.
John Green Crosse, Norwich.
William J. Wilson, Manchester.
William Cleoburey, Oxford.
William Hunter, *Guards.*
John Okes, Cambridge.
James Wardrop, London.
Montague Gosset, London.
Thos. M. Greenhow, Newcastle-on-Tyne.
Sir John Fife, Knt., Newcastle-on-Tyne.
James Ranald Martin, London.

* The first twenty-one are Life Members of the Council.

William Wright, Nottingham.
William Kingdon, London.
William C. Watt, Malta.
Robert Harrison, Dublin.
James William Braine, London.
George B. Knowles, Birmingham.
Robert Armstrong, Plymouth.
Thomas Turner, Manchester.
John Boutflower, Manchester.
Henry Giles Lyford, Winchester.
William J. Wickham, Winchester.
John W. Wilton, Gloucester.
Joseph P. Garlick, Leeds.
John Mawdsley, London.
Edward Tegart, London.
Sir John Webb, Knt., Woolwich.
Sir Jacob Adolphus, Knt., Cheltenham.
John Y. Arrowsmith, Shrewsbury.
Eusebius A. Lloyd, London.
Daniel H. Waine, London.
Henry Edward Burd, Shrewsbury.
Thomas Arthur Stone, London.
William Hey, jun., Leeds.
Richard Hughes, Stafford.
John Masfen, Stafford.
William MacKenzie, Glasgow.
Andrew White, London.
George Macilwain, London.
Thomas Paget, Leicester.
John Hopps, York.
George Buckley Bolton, London.
Robert Craven, Hull.
Robert Ceeley, Aylesbury.
Herbert Mayo, Boppart.
Philip C. De la Garde, Exeter.
Francis P. B. Samwell, London.
George Sampson, London.
Robert Wade, London.
John Prince Halton, Liverpool.
Richard Welbank, London.
John Scott, London.
Edward Cutler, London.
William MacKenzie, Edinburgh.
Isaac Hurst, Bedford.
Charles Aston Key, London.
John W. Johnson, Derby.
Douglas Fox, Derby.
James Syme, Edinburgh.
Richard T. Gore, Bath.
Cæsar H. Hawkins, London.
Richard D. Grainger, Norwood.
Frederick C. Skey, London.
John Harris, Bedford.
F. J. R. Hale Thomson, London.
James Luke, London.
John M. Banner, Liverpool.
Thomas P. Teale, Leeds.
William Eccles, London.
Benjamin H. Norgate, Norwich.
William F. Morgan, Bristol.
Frederick Huntington, Hull.
Price B. Hallowes, Canterbury.
David B. Major, Canterbury.
John C. Taunton, London.
Richard A. Stafford, London.
Bransby B. Cooper, London.
William Sands Cox, Birmingham.
Thomas Wormald, London.
George Pilcher, London.
John Bishop, London.
John George Perry, London.
George Simpson, London.
Gilbert W. Mackmurdo, London.
Francis Kiernan, London.
Henry Heath, Newcastle-on-Tyne.
Henry Russell, York.
John Harrison, Bristol.
Thomas Green, Bristol.
Richard Hey, York.
John Malyn, London.
George Gulliver, *Horse Guards Blue*.
Edward W. Tuson, London.
Henry Clarke, Bristol.
Richard Owen, London.
John Willimot.
William Coulson, London.
Joseph Jordan, Manchester.
Wilson Overend, Sheffield.
John Dalrymple, London.
Samuel Gregory, Sheffield.
Richard Middlemore, Birmingham.
Richard Partridge, London.
John Hilton, London.
William H. Bainbrigge, Liverpool.
Richard Quain, London.
George Mills White, Nottingham.
Thomas C. Buchanan, Gloucester.
Henry T. Chapman, London.
Edward Cock, London.
Henry Denne, Canterbury.
S. W. Langston Parker, Birmingham.
Samuel Solly, London.
Thomas Tatum, London.
Alexander Shaw, London.
John Adams, London.
Alfred Hamilton, London.
George T. Morgan, London.
Henry D. Carden, Worcester.
Samuel A. Lane, London.
John Avery, London.
Frederick Dover, London.
John Hobbs, London.
James Farish, London.
John Dickin, Shrewsbury.
William Pennington, London.
Henry C. Attenburrow, Nottingham.
D. W. Crompton, Birmingham.
Andrew M. M'Whinnie, London.
Edward Wallis, Hull.
Alfred Joshua Wood, Gloucester.
Benjamin Phillips, London.
Henry Cooper, Hull.
George R. Tatum, Salisbury.
Charles Beevor, London.
Henry Jackson, Sheffield.
George Busk, *Dreadnought*.
T. Wilkinson King, London.
John Godwin Johnson, Norwich.
Henry Thomas, Sheffield.
Henry Stubbs, Liverpool.
Charles Lestourgeon, Cambridge.
William Gill, Liverpool.
Rutherford Alcock, London.
Benjamin Travers, jun., London.

Nathaniel Smith, Bristol.
W. J. Erasmus Wilson, London.
Thomas Nunneley, Leeds.
Robert Hughes, Stafford.
William H. Fletcher, Gloucester.
John Harrison, London.
James Long, Liverpool.
Thomas B. Curling, London.
Frederick Le Gros Clark, London.
Carsten Holthouse, London.
John Farrar Crookes, London.
Archibald Dalrymple, Norwich.
Edward F. Lonsdale, London.
Henry Charles Johnson, London.
Henry James Johnson, London.
Cornelius Harrison Browne, Canterbury.
Charles H. Rogers Harrison, London.
Philip Bennett Lucas, London.
Dennis Embleton, Newcastle-on-Tyne.
Henry Hancock, London.
John Gay, London.
John Newton Tomkins, London.
Samuel Holmden Amphlett, Birmingham.
Charles Lewes Parker, Oxford.
Alexander Ure, London.
George Lewis Cooper, London.
William Morrison, Newcastle-on-Tyne.
George Newport, London.
George Viner Ellis, London.
James Duncan, Edinburgh.
Thomas Morton, London.
Edward John Chance, London.
Campbell Grieg De Morgan, London.
John Chippendale, London.
James Dixon, London.
James Paget, London.
Josiah Hammond, Cambridge.
Prescott Gardner Hewett, London.
Francis Hird, London.
Richard William Tamplin, London.
Charles Hawkins, London.
William Trew, London.
Henry Smith, London.

The Naval Lunatics at Haslar.

In no situation has the humane system of treating lunatics been carried out with greater vigour than in the Royal Naval Hospital at Haslar, and nowhere with more satisfactory and gratifying results. So soon as the happy consequences of Dr. Conolly's new system at Hanwell came to the knowledge of the Director-General of the Medical Department of the Navy, Sir William Burnett, he determined on introducing it into the government asylum at Haslar; and he had the good fortune to find in one of the officers of his own service, Dr. Anderson, a man not merely fully convinced of its immense superiority, but practically conversant with its details. For some time previously to his appointment, Dr. Anderson had been the resident physician of the well-known private institution at Denham Park, near Uxbridge, where the non-restraint system was and is carried to its full extent. At the period of Dr. Anderson's appointment, the naval lunatics, both men and officers, were treated pretty much in the old plan, although Sir William Burnett had made strenuous efforts for the introduction of the more rational system. Dr. Anderson's arrival at Haslar was the epoch of a complete reform; and as his views coincided in every respect with those of Sir William Burnett, and as that officer had the entire confidence of the Lords of the Admiralty (who entered into the question with a degree of zeal and liberality highly honorable to themselves), every projected improvement was carried into effect with true nautical energy. The change for the better was the more remarkable for its rapidity. Those who had known the asylum under the old rule could scarcely credit their senses when witnessing, after a few months, the new discipline of the place and the new habits and dispositions of the inmates. Chains, straps, corsets, imprisonment—all vanished at the will of the Superintendent; and the false fears of the attendants, and much of the gloom and misery of the patients, soon followed. This altered condition of things has now existed about two years, and not a single accident has occurred to checker the satisfaction of those who brought it about.

Among the happy changes introduced by Dr. Anderson was one suggested by Sir William Burnett, which does great credit to his humanity, and has been a source of immense gratification to the patients. The airing-court attached to the asylum being at the back of the hospital, which stands on flat ground, was necessarily deprived of all prospect of the surrounding country, and even of the neighbouring sea. To remedy this defect it was determined to erect a lofty mound in the centre of the airing ground; and this was no sooner suggested than it was carried into effect by the lunatics themselves, under the direction of their benevolent superintendent. This mound is of large dimensions, solidly and beautifully constructed, and furnished with a gravel-walk leading by a gentle slope to the summit. It is sufficiently lofty to command a very extensive and beautiful view of the Isle of Wight as far as Cowes

and St. Helen's, the towns of Portsmouth and Portsea, great part of Portsmouth harbour, all Spithead, and the neighbouring sea, with the ever-busy and ever-shifting panorama of masts and sails and flags that crowd that nautical thoroughfare. It is impossible to contemplate, without emotion, the happy influence that such a change as this must have had on the feelings of the sailors. The famous shout of Xenophon's soldiers, "The Sea! the Sea!" seems again realized to the imagination when we think of the feelings that may have stirred the withered souls of those solitary men, when, after years of imprisonment within gloomy walls, they were again, as it were, restored to their old element. How much they prize the privilege thus accorded by the purest and most refined humanity, is proved by the continued eagerness displayed by them in climbing this "sacred mount." A similar elevation is now being built in the grounds of the officers' department.

A still bolder step in the progress of the rational and humane treatment of these poor fellows, and, we doubt not, in the cure of their bruised and broken minds,—an improvement which strikes us almost as much by its happy boldness as by its genuine benevolence,—has been more recently introduced. A boat has been granted to them by the Admiralty; and in this they may now be seen pulling and steering their fearless and noble-hearted friend and master, Dr. Anderson, not only through Portsmouth harbour, but actually out to sea, calmly enjoying the cooling breeze, or busy in their long-forgotten pastime of fishing.

But the account of this affecting experiment, and a few more interesting particulars of the proceedings of the Naval Asylum, we are enabled, through the kindness of Sir William Burnett, to give in Dr. Anderson's own words; and we cannot present them to our readers without offering to that gentleman the tribute of our respect and gratitude for his enlightened and noble exertions.

Extract from Dr. Anderson's Report, Midsummer Quarter, 1843.—"The calm and orderly conduct which now prevails throughout the asylum, together with the cleanly, and I may add industrious, habits of a large proportion of the patients, render the duties of the attendants and nurses comparatively easy. For the accomplishment of these desirable ends I have endeavoured to carry out the excellent precepts laid down by Dr. Conolly of Hanwell; and in order to point out clearly the principles by which the medical officers themselves are guided, and that they constantly inculcate on the attendants and nurses, I cannot do better than quote the following paragraph from one of that talented physician's Reports. 'To endeavour to gain and preserve the confidence of each patient; to create or maintain a character of kindness and tranquillity throughout the asylum; to forbid the exercise of violence, threats, or deception; to be careful of their diet and clothing; to occupy and amuse them; to secure their cheerfulness or content by day and comfortable rest at night; to consider all their weaknesses and infirmities; and to pay a general regard to whatever may act favorably on the mind and body.' These have been and continue to be the principles on which our moral management is based, and the fruits of this mild and rational treatment are now clearly developed in the altered condition of our inmates, whose conduct for many months past has very generally been characterized by a constant and orderly demeanour, which I am persuaded no coercive measures could ever have produced. The means of recreation and exercise which have wisely been extended to the patients in allowing them to walk into the surrounding country, continue to be a source of great delight to many; and nothing is felt as a more severe punishment than this salutary freedom being withheld from any of those who are usually in the habit of joining the party in these country excursions. The cheerful aspect of the new airing-grounds with the mound in the centre, has been very much increased by the late alterations; and being now thrown open in fine weather, have become the daily resort of a large proportion of the patients. The inducement thus offered to the indolent and melancholic to take a view of Spithead, Portsmouth harbour, Isle of Wight, and the surrounding country, is found not only to form the means of amusement and exercise, but, it may almost be said, some alleviation of their malady.

"The religious services continue to be regularly performed in the asylum morning and evening; and it is rather surprising to find between sixty and seventy insane persons assembled together for the purpose of divine worship without the occurrence of any disturbance, except on very rare occasions. Upwards of twenty attend the

service in the chapel every Sunday; and their conduct during divine worship has been uniformly marked by the same decorum as the sane part of the congregation.

"In consequence of directions from the Inspector-General, the dress for the seamen and marines was changed at Easter, the whole of the lunatic patients being now supplied with blue clothing instead of the brown formerly worn. This change to their favourite colour has given the seamen great satisfaction; and no doubt has in some of the number brought back to their recollection early and pleasing associations.

"The many alterations, sanctioned and promoted by the Inspector-General, which have taken place generally throughout the asylum during the last twelve months, have contributed in no small degree to the improved condition of the patients; and when the works now in progress are completed, the whole face of the establishment will be changed from its former gloomy and prison-like appearance to a cheerful place of residence, which will neither be calculated to create alarm in the timid and suspicious, nor excite the rage of the more furious madman."

Extract from Dr. Anderson's Report, Michaelmas Quarter, 1843.—"The Lords of the Admiralty have very recently, on the recommendation of Sir William Burnett, furnished a boat for the use of the lunatic patients; and since it has been received from the dockyard they have had many rowing and several sailing excursions, both in the harbour and out to Spithead. Upwards of twenty of the patients have, at different times, joined in this amusement; and on every occasion they have behaved in the most quiet and orderly manner, and can now, after the practice of some weeks, manage the boat either under sail or in rowing with perfect ease and dexterity. I shall not attempt to describe the enjoyment which many have felt by being again permitted to embark on their favorite element, nor the pleasure with which they look forward to these water-excursions. Some of those who have proved to be our best boatmen have been confined within the narrow limits of the asylum airing-grounds for upwards of twenty years; but, notwithstanding this protracted period of seclusion, their new occupation appears to have roused mental energies which to the common observer were nearly extinct, and to have brought back to their enfeebled minds old and pleasing associations which have been productive of the most beneficial results. I have no hesitation in stating that of all the remedial agents with which we have during the last eighteen months been so liberally supplied, the use of the boat for many of our patients is, beyond all comparison, the most valuable of any; and my anticipations, sanguine as they were as to the benefits likely to result from that kind of exercise and recreation on the mind of the lunatic sailor, have been most fully and completely realized.

"The Inspector-General has also directed a supply of fishing lines and hooks to be furnished, and the patients have frequently, during the last month, been successfully occupied in fishing, which is also a source of great enjoyment and interest to many. Mr. * * * affords, among many others, a striking example of the salutary influence resulting from the new occupation. This officer has been in the asylum for eight years, and during the last six has very rarely spoken to any one, and appeared to take little or no notice of surrounding objects. The various means that were had recourse to with the view of rousing him from his apathetic state proved fruitless. He, in common with others, was furnished with a fishing line; and on his first trip to the buoy of the Boyne, which is our principal fishing ground, caught nine whiting-poult, and enjoyed the sport as intensely as any one in the boat, baiting his hooks himself, and making observations on his success. On our way home he took all the fish that were caught out of the basket and *counted them aloud*, much to the astonishment of the steward and myself, as well as to others who had scarcely heard the sound of his voice for several years. It is a pleasing part of my duty to be thus enabled to report the complete success of a measure which, in the estimation of many, was fraught with so much personal danger to the lunatic, by affording him an easy opportunity of carrying any suicidal propensity into effect; but the truth is, that, in well-regulated establishments for the reception of the insane, the tendency to self-destruction is nearly, if not altogether, as rare as amongst those who are considered the sane part of the community.

"It is scarcely necessary to state that no bodily restraint has been had recourse to; but, as was explained to the Inspector-General during his recent official visit, it has frequently happened that for many days in succession not a single individual has

been placed in temporary seclusion, thus clearly demonstrating the many advantages resulting from a mild and conciliatory system of management as compared with harsh and coercive measures.

"In conclusion, I may be permitted to state the extreme gratification I have felt in witnessing the progressive but steady improvement in the general demeanour, the cleanly habits, and the contented appearance of many whose condition, twelve months ago, scarcely held out, under any treatment, the prospect of such cheering results."

We think that no one after reading the foregoing account, will hesitate to place the name of ANDERSON high on the list of those noblest philanthropists who are proud to own Dr. Conolly as their chief. Through his exertions and those of Sir William Burnett, we are justified in saying of HASLAR what Professor Marx so finely said of HANWELL: and we think the Professor's words, which we once proposed as a motto for Hanwell, may with full propriety be now inscribed on the walls of Haslar:—"HIER WIRD DURCH DIE THAT BEWIESEN WAS DER MENSCH ÜBER DEN MENSCHEN DURCH DAS MENSCHLICHE VERMAG."

CALCULOUS DISEASES IN THE MAURITIUS.

Mauritius; 22d July, 1843.

To the Editor of the British and Foreign Medical Review.

SIR,—In the number of your Review for April, 1843 (which reached this a few days ago), I saw in the criticism of Rayer on the 'Disease of the Kidney' the following sentence: "The frequency of this gravel (lithic acid) in the youth of the Mauritius makes it a question of interest whether adults suffer in a higher proportion from stone than those in other countries: this M. Rayer's information does not enable him to say." (p. 482.)

As I have been, through the kindness of the medical practitioners, made acquainted with most cases of importance in surgery which have occurred since my arrival here in 1832, I think myself competent to give the information you are anxious to obtain; and, since reading the number of your Review referred to, have taken the precaution of consulting most of the practitioners of the island on this point.

During the last ten years, out of an average population of 111,731 (from official documents), I am only aware of twelve cases of stone in the bladder, one of which occurred in a female: of course those in which small calculi have been voided by the efforts of the patient's bladder are not included. Of the calculi in the twelve cases alluded to, five were broken up with the lithontriptor, by Mr. Rogers and Dr. Dunbar, (two successfully, and three died from inflammation of the bladder, or constitutional irritation.) The sixth was that of an Irish lad aged 16, six years in the colony, who died at the Civil Hospital, in whom a large calculus of triple phosphate was found after death. In the seventh, a stone the size of an almond was propelled into the membranous part of the urethra, and was cut down on by Dr. Penison of the 87th regiment. It slipped back into the bladder, but some weeks later was expelled by the artificial opening in the perineum, and is now in my possession. It is composed of phosphate of lime. The eighth was that of a boy eight years of age, from whom I extracted a calculus, of two inches long by one in diameter (weighing ten drachms, sixteen grains), by the lateral operation performed with Mr. Liston's knife. This calculus was analysed by my friend Mr. Rogers, who found that it was composed of ammoniaco-magnesian phosphate, with a little phosphate of lime and small quantities of lithate of lime and ammonia, on a nucleus of lithic acid. The patient walked out on the twenty-first day after the operation, and soon regained excellent health. The three remaining male cases were lost sight of. In the female a calculus the size of an almond, being entirely composed of phosphate of lime, projected from the meatus urinarius while voiding urine, and she herself pulled it out.

Discharges of sabulous matter with the urine are common at all ages here; and the many we have examined by the microscope were composed of lithic acid, with the exception of those from a native of Norfolk, England, which were crystals of triple phosphate, voided with great pain. In pigs, however, calculi of an inch or two in diameter, have been frequently found in the urinary bladder after death, generally composed of carbonate of lime: in the centre of one we observed a piece of straw two lines in length.

Your obedient servant,

ROBERT ALLEN, Staff Surgeon 2d class H.M. service.

OBITUARY.

Sketch of the Life and Character of the late Thomas Harrison Burder, M.D.

The subject of this brief notice died at Tunbridge Wells, on the 16th of August, 1843, in his fifty-fourth year. His ancestors, for several generations, had been remarkable for simplicity, benevolence, and wisdom; and his father, the Rev. George Burder, was one of the most distinguished Christian philanthropists of his day. Dr. Burder's life was marked by few incidents calculated to attract attention; but it presents an example of self-denying humanity as well as of conscientious devotion to professional duty, which ought not to pass unrecorded.

Dr. Burder studied medicine at Edinburgh with much assiduity, and obtained the friendship of some of the best and wisest men adorning that seat of learning: where also his characteristic benevolence was evinced by the faithful and almost brotherly interest which he took in the welfare and success of those students with whom he was on terms of intimacy. In 1812 he was elected to the office of President of the Medical Society, an appointment always indicative of merit in the holder. He left Edinburgh in 1815, and shortly afterwards commenced practice in London. He soon, also, connected himself with a large public dispensary, the duties of which he fulfilled with exemplary zeal and humanity. In 1827 he married and settled in Brunswick square; but his health proved unequal to the exertions which a steadily increasing professional reputation necessarily entailed.

His constitution was naturally susceptible; he had long been subject to attacks of dyspeptic headach, and had frequently suffered from mental application during a long and laborious course of study. A severe attack of headach thus produced at Edinburgh, treated by depletion, general and topical, supposed to have been excessive, increased his natural susceptibility to such a degree, that his subsequent life was but a long disease, confirmed perhaps or aggravated by perseverance in mental labour and excitement, and by a prepossession in favour of lowering treatment. The onerous nature of his duties in London brought on an increase of the pain and excitement of head. For these symptoms, general and local bleeding, murcurial purgatives, antimony, and low diet were considered necessary. Under this treatment the symptoms certainly subsided considerably, but the brain and nervous system remained in a state of augmented and extreme susceptibility.

On some recurrence of pain it was judged needful to shave the head. This happened to be done on a cold wet evening, under circumstances of great exhaustion, and the ordinary covering of a thin nightcap was alone worn during the ensuing night. On awakening from sleep a severe constrictive pain was felt over the whole head, attended with heat and tenderness of the scalp, throbbing of the temporal arteries, much cerebral excitement, and vomiting. An affection of the pericranium was now considered by him to have been ingrafted on cerebral excitement; but, after the superficial tenderness had subsided, the original affection still proved intractable.

Such was the severe and various suffering which so soon disqualified Dr. Burder for the arduous duties of medical practice in London. Any case involving more than ordinary anxiety aggravated the headach, and this anxiety was peculiarly felt by him in relation to diseases of the chest. The introduction of the new method of exploring pectoral diseases by auscultation was materially changing the aspect of this department of medicine, and a sense of duty urged him to become conversant with the indications afforded by the stethoscope; but he found the study beset with many difficulties, and a conscientious reluctance to undertake the treatment of pectoral complaints without possessing a more intimate acquaintance with the physical signs than his impaired constitutional energy would enable him promptly to obtain, at last determined him to leave London.

In the year 1834 Dr. Burder made a tour into Devonshire with advantage to his general health, but with no relief to his headach, which indeed was rather increased by the excitement of the journey. In the autumn he took up his abode at Tilford, near Farnham, and remained there four years He enjoyed the quiet of this secluded spot, but the pain of head was not much lessened. Continued suffering, however, had not overcome his desire to be usefully employed; and having given a

fair though unsuccessful trial to the plan of repose, in 1837 he settled at Tunbridge Wells, where the growing confidence of his professional brethren again placed his talents in request. But in the autumn of 1838 increasing headach obliged him to restrict his attentions to a limited number of patients at his own residence; and the corroding anxiety produced in his mind by hopeless cases, at last induced him to withdraw from practice altogether.

In the year 1840, after irritation of the intestines and other organs, accompanied with rheumatic pains, some œdema of the legs occurred, and his strength was considerably reduced. This state continued in the following year. The heart had also been supposed to be affected; but, on careful examination, no change in that organ could be detected. In the summer of 1842 an obstinate and prolonged attack of constipation, for which calomel, colocynth, and ultimately turpentine were administered, was followed by pain of the arms and muscular debility, rendering it difficult to button the coat or guide the hand in writing, yet without loss of feeling. The pulse conveyed to the touch the impression of a vessel supplied with blood, defective both in quantity and quality; which circumstance, and the presence of nervous symptoms resembling those commonly present in hysteria, led to the recommendation of iron as a remedy. The citrate was accordingly tried, but soon suspended in consequence of the patient's apprehension that it increased the headach. His general strength afterwards improved, but some weakness remained in the thumb and index-finger of the left hand. A visit to Brighton produced slight amendment, but he soon relapsed into a state of great weakness accompanied with intestinal torpor. During the early part of 1843 he perceptibly declined in strength, and in August was reduced to a state of extreme debility. On one occasion, asking for a looking-glass, and observing an aphthous appearance of the mouth, which, under the circumstances, was an ominous symptom, he calmly remarked, "I was quite right—this attack is fatal;" and within a few days afterwards made a peaceful exit from this scene of protracted suffering.

The post-mortem examination revealed no very remarkable traces of disease. There was considerable effusion beneath the arachnoid membrane of the brain and spinal cord, but perhaps not more than frequently occurs in debilitated subjects independently of disease, shortly before or even subsequently to dissolution. The brain was firm and natural, but deficient in blood. The lining membrane of the stomach near the cardia much injected. The lungs and liver healthy. The heart small and soft, but free from disease.

The question naturally arises, whether the protracted sufferings in the head and bowels were the result of susceptibility produced by depletion, or were occasioned by organic conditions, prevented, by active treatment, from inducing visible changes of structure. But in whatever manner this question may be solved, it is difficult to avoid the conclusion that health and life were sacrificed to inordinate intellectual exertion and moral sympathies, the influence of which no physical treatment could effectually control.

Dr. Burder's mental qualities were of a superior order. His accuracy in observing facts, and caution in deducing conclusions, are evinced in an interesting paper published by him in the 'London Medical and Physical Journal' for June, 1837, on the question of the cerebral origin of paraplegia; in which he endeavours to prove, as in cases of this kind of palsy ascribed to the brain, the spine was either found to be affected or left unexamined. A habit of exact discrimination rendered his practical opinions remarkably free from empiricism. He gave a careful consideration to the peculiarities of each patient's case, and habitually prescribed for the individual *variety*, not for a *species* or *genus* of disease. His communications in the 'Cyclopædia of Practical Medicine,' on the subjects of Headach and Jaundice, possess considerable merit; and the former essay is particularly valuable, among other reasons, by enforcing a truth too often overlooked, namely, that in many cases of headach apparently arising from indigestion, the stomach is *secondarily* affected, in consequence of undue exertion of the *brain*.

In evidence of his intellectual activity, it may be mentioned that even when increasing indisposition rendered it necessary for him to retire from practice, he contemplated delivering a series of lectures on the circumstances which should guide

selection among medicines of analogous properties; justly regarding the neglect of such discrimination as one of the chief sources of medical failure, and one of the principal encouragements to that ignorant and bold empiricism by which the public are so dangerously deluded.

During his seclusion at Farnham he did not relinquish schemes of active usefulness; and, amongst other things, produced the 'Letters from a Senior to a Junior Physician,' which are distinguished by a spirit of Christian philanthropy combined with sound discretion.

In illustration of the simplicity and unaffectedness of manner which characterized Dr. Burder, it may be interesting to adduce his answer to the inquiry to what extent a medical practitioner might be justified in studying a manner best calculated to win the public confidence.

"Doubtless," he observes, "a confident manner and an oracular expression of opinion, superficial and inaccurate though it may be, obtain from the multitude an undue degree of respect *at first*; but the more modest and more highly qualified man will ultimately surmount any real or supposed external deficiencies; while every instance of gratifying confidence will do much to give a legitimately authoritative address. Close attention, unaffected interest and earnestness, careful investigation, and perfect candour and simplicity are qualities which almost every one can appreciate, and which will eventually command a more extensive influence than all the arts and manœuvres of self-confident boasters. At all events a man's natural manner is the best for himself, since it accords with his mind and character; and, being natural, will give a genuineness for which all the elegancies and studied doings of others could not compensate."

Dr. Burder's mind, kept vigilantly free from prepossessions and routine, was always disposed to yield an unprejudiced consideration to any suggestion offered in a philosophical spirit.

In his general demeanour, a manner peculiarly bland and courteous, harmonized with a graceful delicacy which shrunk from wounding the feelings of the humblest individual; whilst no amount of personal suffering suppressed the expansive zeal ever kindling within him to promote every benevolent scheme for the benefit of his fellowmen. Equally apt to applaud excellence and disinclined to censure imperfection, he was never known to sully the fair fame of a competitor, or to withhold a ready testimony to another's worth. Unflinching in the maintenance of what he conceived to be sound principles, he was yet diffident of his own judgment, and never conducted argument beyond the limits of the most delicate courtesy.

In professional intercourse he was ever ready to screen his brethren from any discredit which the unavoidable imperfection of our art might involve; and delighting to hear of the merited success of others, was incapable of that illiberal feeling which could apprehend in another's progress any impediment to his own. In relation to patients it was obvious that his interest and ease were regarded by him as secondary objects, and that his anxious thoughts were directed not so much to pecuniary gain as to the improvement and benevolent application of medical resources. His conscientious and sustained attention to his patients' condition seldom failed to secure their confidence, whilst his genuine sympathy, and regard to their mental and bodily welfare, won the friendship of all those who knew how to appreciate excellence. His feeble health and ultimate retirement were indeed mainly attributable to a sense of inability to realize the high estimate which he held of the duties of a physician.

But amidst conscious imperfection his hopes rested on the cardinal doctrines of Christianity; the light of which guided his course. That light no assumption of superiority tempted him to obtrude, but no timid reserve induced him to hide. The description he once wrote of another may be fairly applied to himself: "The doctrines of Christianity were the foundation of his hopes, and its holy precepts the invariable rule of his conduct; and confidence in the religion of the gospel proved his solace in affliction and support in death."

Dr. Burder has left no family; but his widow, long the soothing associate of his weakness and sufferings, awaits in calm resignation the period of reunion to one who although withheld by delicate health from attaining the elevated position which his talents and acquirements might otherwise have secured, yet well deserves an honoured place among the worthies of our profession.

BOOKS RECEIVED FOR REVIEW.

1. On Ankylosis, or Stiff Joint; a practical treatise on the contractions and deformities resulting from diseases of the joints. By W. J. Little, M.D.—London, 1843. 8vo, pp. 149. 8s. 6d.

2. On the Arrangement and Nomenclature of Mental Disorders; a Prize Essay. By H. J. Johnson, M.D.—London, 1843. 8vo, pp. 33. 1s. 6d.

3. Removal of Dropsical Ovaria entire, by the large Abdominal Section. By H. D. Walne, Surgeon. (From the Medical Gazette.)—Lond. 1843. 8vo, pp. 11. 3s. 6d.

4. Principles of Forensic Medicine. By W. A. Guy, M.B. &c. Part I.—Lond. 1843. 8vo, pp. 184. 4s.

5. The Vital Statistics of Sheffield. By G. C. Holland, M.D.—London, 1843. 8vo, pp. 263.

6. Practical Directions for the Preparation of Aërated Waters, &c. By R. Venables, A.M., M.B.—Lond. 1843. 12mo, pp. 110. 4s.

7. Some Account of the Epidemic Scarlatina which prevailed in Dublin from 1834 to 1842 inclusive. By Henry Kennedy, A.B, M.B. &c.—Dublin, 1843. Small 8vo, pp. 213.

8. Tic Douloureux, or Neuralgia Facialis, &c. By R. H. Alnatt, M.D. Second Edition[?].—Lond. 1843. 8vo, pp. 223. 5s.

9. Glossology; or, the additional means of Diagnosis of Disease to be derived from indications and appearances of the Tongue. By B. Ridge, M.D. (Read before the Senior Society of Guy's Hospital, Nov. 4, 1843.)—Lond. 1844. 8vo, pp. 88, with Engravings.

10. A Pathological and Philosophical Essay on Hereditary Diseases; with an Appendix, on Intermarriage, &c. By J. H. Steinau, M.D.—Lond. 1843. 8vo, pp. 52. 3s. 6d.

11. Lectures on the Principles and Practice of Physic, delivered at King's College, London. By T. Watson, M.D., &c. In two vols.—Lond. 1843. 8vo, pp. 830, 812. 34s.

12. Animal Physiology (Popular Cyclopædia of Natural Science). By Wm. B. Carpenter, M.D.—London, 1843. 8vo, pp. 579. 10s.

13. A Practical Treatise on Organic Diseases of the Uterus; the Fothergillian Prize Essay for 1843. By J. C. W. Lever, M.D. —London, 1843. 8vo, pp. 240. 9s.

14. Elementary Instruction in Chemical Analysis. By Dr. C. R. Fresenius. Edited by J. L. Bullock.—London, 1843. 8vo, pp. 284. 9s.

15. Principles of Medicine. By C. J. B. Williams, M.D., F.R.S.—Lond. 1843. 8vo, pp. 390. 12s.

16. Pathological and Histological Researches in Inflammation of the Nervous Centres. By J. H. Bennett, M.D., F.R.S.E., &c.—Edinburgh, 1843. 8vo, pp. 83.

17. Report of the Commissioners appointed to take the Census of Ireland for the year 1841.—Dublin, 1843. Folio, pp. 887.

18. The British Journal of Homœopathy. Edited by J. J. Drysdale, M.D., J. R. Russell, M.D., and F. Black, M.D.—Edinb. 1843. Vol. I.

19. The Oculist's Vade Mecum: or complete practical system of Ophthalmic Surgery. By John Walker, Surgeon to the Manchester Eye Hospital.—Lond. 1843. Sm. 8vo, pp. 400. With woodcuts. 10s. 6d.

20. Elements of Natural Philosophy. By Golding Bird, M.D., F.L.S. Second Edition, enlarged.—London, 1844. 8vo, pp. 479. 12s. 6d.

21. An Anatomical Description of the Gravid Uterus and its contents. By the late William Hunter, M.D., &c. Second Edit. By Edward Rigby, M.D.—London, 1843. 8vo, pp. 75. With 8 plates. 5s.

22. Principles of Forensic Medicine. By W. A. Guy, M.B. Part II.—Lond. 1843. 4s.

23. The Surgeon's Vade Mecum. By R. Druitt, Surgeon. 3d Edit, with 95 Engravings.—Lond. 1843. 8vo, pp. 572. 12s. 6d.

24. The Physiology of Inflammation, and the Healing Process. By Benjamin Travers, F.R.S., &c.—London, 1844. 8vo, pp. 226. 7s.

25. A concise Exposition of Homœopathy, its Principles and Practice. By G. Newman, M.R C.S.—London, 1844. 8vo, pp. 68.

26. A Manual of Medical Jurisprudence. By Alfred S. Taylor.—London, 1843. 8vo, pp. 679. 12s. 6d.

27. On Superstitions connected with the History and Practice of Medicine and Surgery. By T. J. Pettigrew, F.R.S.—Lond. 1844. 8vo, pp. 167. 7s.

28. A Dictionary of Practical Medicine. By J. Copland, M.D., F.R.S. Part IX. 4s. 6d.

29. The Sources of Physical Science: being an introduction to the study of Physiology through Physics. By Alfred Smee, F.R.S.—Lond. 1843. 8vo, pp. 246. 10s. 6d.

30. The Cold Water Cure, &c. By R. Beamish, Esq., F.R.S.—Lond. 1843. 8vo, pp. 100.

ERRATUM. In the review of Becquerel, in our last Number, by an oversight which we much regret, the words "grain" and "grains" are printed for "gramme" and "grammes" throughout the article.

THE
BRITISH AND FOREIGN
MEDICAL REVIEW,

FOR APRIL, 1844.

PART FIRST.

Analytical and Critical Reviews.

Art. I.

Traité Clinique et Pratique des Maladies des Enfans. Par MM. Rilliet et Barthez.—*Paris*, 1843. Three Vols. 8vo, pp. 2408.

A Clinical and Practical Treatise on the Diseases of Children. By MM. Rilliet and Barthez.—*Paris*, 1843.

This is by far the most valuable work on the diseases of children with which we are acquainted. It is not, as some French treatises on this subject have been, a mere mass of rude and ill-arranged materials, collected hurriedly during a brief residence in the hospitals of Paris, but it is the result of the careful observation of two gentlemen whose opportunities for investigating the diseases of children were very considerable, and who appear to have been singularly well qualified for turning those opportunities to the best account. It was in the year 1837 that they commenced their labours, and in 1838 they published an essay on 'Pneumonia in Children,' which we noticed with its due meed of praise in our Number for October, 1841. The authors were both *internes* at the Hôpital des Enfans Malades, and as the result of a successful *concours* one of them was enabled to remain there for two years beyond the usual period of an *internât*. Their field of observation was therefore unusually extensive, while some years subsequently devoted to private practice have enabled them to correct any erroneous opinions into which the peculiarities of that field might have led them. Since the appearance of their treatise on pneumonia they have published occasional essays on other diseases of childhood, the merit of which led us to form very high expectations of what this treatise would be; but high though our expectations were, they have not been disappointed. Two circumstances confer a peculiar value upon this work: one, the fact that the authors have rejected their earlier observations, and found their statements exclusively on those made after they had acquired a certain familiarity with the subject; the other, that they in every instance state the number of cases of each disease of which they have kept a record, so that we are never left at a loss as to the degree of weight which should be attached to their statements. There is, more-

over, an air of truth and good faith pervading all their observations; and they must be admitted to be much more conversant with the writings of others than most of their countrymen.

As critics, then, we shall have but little to do, and shall prefer the much more welcome task of introducing our readers to some of the many valuable observations which abound in these volumes. Still, as we trust to see the work pass through many editions, we will offer to its authors one or two suggestions calculated, in our opinion, to increase its utility. First, then, we think the nosological arrangement they have adopted is attended with many practical inconveniences, which are not atoned for by corresponding benefits. The authors have classed the different diseases under the six heads of Inflammations, Dropsies, Hemorrhages, Gangrenes, Neuroses, and Fevers; and have formed two other classes, of which the one includes Tubercular Degeneration, the other the Entozoa. The result of this attempt at scientific arrangement, founded on principles the correctness of which many will be disposed to doubt, is that very dissimilar diseases are placed in juxta-position, while those which, from seat or symptoms, often present the closest resemblance are treated of in different volumes. The table at the end of the third volume—in which the diseases are classed according to regions—does not remove, though it diminishes, this inconvenience; and in the next edition we should decidedly prefer a classification founded on regions. The appendix, too, will doubtless be removed to its proper place, as an introduction to the whole work. Our grand quarrel with the authors, however, is on the score of the extreme prolixity of their style, which has swelled out a manual for students into three closely-printed octavos of 800 pages each. We are quite convinced that by the mere curtailment of divisions and subdivisions—multiplied till, as the German proverb has it, "one cannot see the wood for the trees,"—by avoiding needless repetitions, by abridging their articles on the eruptive fevers, and by omitting the historical details—all that is really valuable might be compressed into two volumes. The articles on smallpox, measles, and scarlatina occupy 350 pages; but on subjects concerning which so much has been already written it would have been sufficient if the authors had added such remarks only as were new, or, at least, such as their personal experience had taught them to be of peculiar importance. The historical details, too, which for the most part are taken at second-hand, and often from that very incorrect author, Ozanam, add, in our opinion, to the size rather than to the value of the book. But we will now pass to a more leisurely examination of its contents.

CHICKEN-BREAST. In the introductory remarks at the commencement of the first volume, and in the appendix at the end of the third, are many valuable observations on the physiological peculiarities of childhood, both in health and disease, and on the best mode of conducting the examination of any case of illness in children. The remarks on the mode by which that deformity of the chest in childhood commonly called the chicken or pigeon-breast is produced strike us as new. Slight degrees of it are by no means unusual, and often occasion parents a needless amount of anxiety from their supposing it to be a sign of phthisis. It is, as MM. Rilliet and Barthez remark, in rickety children that the pigeon-breast is found in its most marked degree. The sternum is then extremely

prominent, and of an arched form; the cartilages of the ribs run backwards, as if about to touch the vertebral column, and the axillary region is thus rendered remarkably flat. The union of the bones with the cartilages of the ribs is marked by a row of rounded prominences on either side of the chest, which are most evident about its base, and either occupy the most depressed part of the thorax or are situated a little anterior to it. This contraction of the chest exists in almost its entire length; namely, from the second or third rib to below the nipple: at this level the false ribs project and envelop the upper part of the abdomen, thus increasing the apparent depression of the chest. The size of the abdominal viscera and the intestines distended with flatus impart a spherical form to the abdomen, which is rendered still more marked by a curvature of the spine in the lumbar region, the concavity of which is directed forwards, and which diminishes the abdomen in a vertical direction.

If we watch the respiratory movements of a chest thus deformed, we shall observe a series of very remarkable phenomena, which will help us to understand the mechanism by which the deformity is produced.

.... "During each inspiration the abdomen swells out considerably, while the chest, on the contrary, becomes contracted in such a manner as to exaggerate the peculiarity of form mentioned above; the contraction is especially well marked, a little below the nipple, as though a girdle were surrounding the chest in that situation, and forcing the abdominal organs downwards. Above this circular depression is another vertical one, reaching from a level with the axilliary region to that point where the false ribs project: and through the whole of this space, the ribs as well as the intercostal spaces become collapsed during inspiration; while the sternum is carried a little forwards and upwards. During expiration, on the contrary, the opposite phenomena occur, and the chest reverts to that state described above." (pp. 646-7.)

.... "This circular constriction which takes place at the base of the chest, and by which all its lateral parts are approximated to each other, shows plainly that the diaphragm, by its powerful and constantly-recurring action, contributes in some degree in producing the deformity. It is true that the question may be asked why the muscles which are the antagonists of the diaphragm do not prevent the collapse of the ribs, since it is necessary for the diaphragm to act effectively that the ribs should be fixed by the inspiratory muscles. It must, however, be observed, that these muscles are not inserted into the ribs at the same points as the diaphragm. Thus, the insertion of the pectoralis minor, and of the serratus magnus is behind or rather above that of the diaphragm, so that a considerable space intervenes between the attachment of these antagonist muscles. Now, so long as the costal lever continues firm, it is able to resist the traction in opposite directions to which it is subjected; but if it becomes softened in this interspace, the pectoralis minor and serratus magnus dragging it outwards, while the diaphragm draws it inwards, a constriction takes place at the weakest point, which point at the base of the chest is a little above the attachments of the diaphragm. With reference to the pectoralis major, its action is altogether different in these cases; for it is attached to the sternum itself, which it tends, in deep inspirations, to draw forwards and upwards, so that it does not in any way contribute to binder the formation of that depression which takes place posteriorly to it. From all these muscular actions it results:

"1st. That a circular constriction of the base of the chest is formed by the diaphragm.

"2d. That the sternum is carried forwards, or more strictly, perhaps, maintained in its position by the action of the pectoralis major.

"3d. That below this circular constriction, the false ribs are forced upwards by the resistance of the abdominal viscera." (Vol. iii, p. 650.)

The vertical depression of the chest which likewise exists in these cases, is the result of the parietes of the thorax not being sufficiently strong to resist the contractility of the lungs.

This alteration in the form of the chest is a point of very considerable practical importance, since it modifies the signs furnished by auscultation, and might lead those who were not aware of it into erroneous conclusions. For very valuable remarks, on this subject, however, we must refer to vol. iii, p. 654.

An emphysematous condition of the lungs, produced by the pressure of the ribs, is one extremely frequent result of rhachitic deformity of the chest. MM. Rilliet and Barthez suggest that, in the case of adults reported to have suffered from emphysema from their earliest infancy, it is probable that this deformity of the chest had existed, and though they might have outgrown it in after-life, yet its effects on the respiratory organs were persistent. (Vol. i, p. 135.) Other causes, however, tend to produce emphysema, as bronchitis or pneumonia, or, in short, almost any affections that are attended with considerable acceleration of breathing. They deny, however, the frequency of emphysema as a result of hooping-cough, unless when complicated with bronchitis or pneumonia, since in the simple forms of the disease the conditions requisite for the production of emphysema do not exist.

"Each paroxysm consists of a series of expirations followed by one long and sibilant inspiration. Thus, on the one hand, the series of expiratory efforts almost empty the lung of the air it contained, and consequently operate in a manner directly opposed to that which is the mechanical cause of emphysema; while on the other hand the long and sibilant inspiration which succeeds the expiration, takes place under the influence of a constriction of the larynx, trachea, and bronchi, which does not allow the air to pass beyond the larger bronchial tubes. The expulsion of the air and its subsequent imperfect entrance into the air-cells during the paroxysm, are the two phenomena which account for the absence of emphysema." (Vol. ii, p. 217.)

HOOPING-COUGH. The article on this disease, though not one of the most valuable in the work, contains some extremely important observations on the diagnosis of the affection. Those who are most conversant with the diseases of children must often have been struck by the erroneous statements that parents make with reference to their children having had hooping-cough. Medical practitioners, too, are sometimes misled on this point, and pronounce that a child has got pertussis if they once hear it hoop while coughing. Not every child, however, who has been heard to hoop has, of necessity, got hooping-cough; an occasional hoop is not very unusual in ordinary catarrh, especially in children who are teething; and MM. Rilliet and Barthez point out (vol. ii, p. 224 et seq.) two diseases of very different characters, each of which may be, and often is, confounded with hooping-cough. Acute bronchitis attended with cough recurring in paroxysms is one of these diseases; the other is tubercular degeneration of the bronchial glands. The former of these affections may be distinguished from hooping-cough by the general absence of a catarrhal stage introducing the paroxysms of cough, by those paroxysms being usually shorter, less intense, often unattended with hoop, or at any rate accompanied with a very rare and indistinct hoop; and without expectoration or vomiting. It is associated from the

very commencement with intense fever and accelerated respiration, a small pulse, anxious countenance, and extreme dyspnea, and tends rapidly to a fatal termination. Tubercle of the bronchial glands may be distinguished by the paroxysms of cough being usually very short, and unattended either with hoop or with mucous expectoration, or with vomiting. In its course, too, attacks of asthma often occur which alternate with the paroxysms of cough; it is frequently attended with alterations in the character of the voice, and is associated with hectic fever and night sweats, and may further be recognized by the physical signs of tubercular disease.

Stomatitis and Cancrum Oris. The subjects of stomatitis and cancrum oris are very carefully examined at vol. i, p. 260, and vol. ii, p. 149. These diseases, though essentially distinct, are very frequently confounded; an error which in our own country has been extremely common. The former is a frequent, the latter an infrequent affection; the former sometimes prevails epidemically and appears to have a contagious character; at any rate several children in the same family often suffer from it at once, while the latter occurs only in isolated cases, and is clearly destitute of all contagious property; in short, the former runs a chronic course, and has no tendency to become gangrenous, while the latter is gangrenous almost from the beginning, and runs a rapid couse to a fatal termination. The differences between the two diseases are well and concisely stated by the authors as follows:

"*Stomatitis*	"*Gangrene*
"Begins by an ulceration, or by a deposit of plastic false membrane.	"Begins by an ulceration which is sometimes gangrenous from the first, or by an œdema of the cheek.
"Odour very fetid, and sometimes gangrenous.	"Odour always gangrenous.
"The local lesion does not extend far; the parts always preserve the same appearance.	"Extends considerably, and with rapidity; the tissues assume a peculiar blackish gray colour.
"But little swelling of the cheek or lips, or simply œdema of the part, without any hard portion in the centre, without tension, and without the peculiar oily appearance.	"Very extended swelling and œdema of the cheek, with a nucleus of engorged tissue in the centre; considerable tension of the parts, with an oily appearance mottled with portions of a violet hue.
"Secretion of saliva seldom so profuse as to run out of the mouth: when it is there is sometimes an admixture of blood, but never of the *debris* of gangrenous structures.	"Abundant salivation, constant discharge of fluid from the mouth, at first bloody, then putrilaginous.
"No eschar ever forms externally.	"An eschar often forms on the cheek or lips.
"The soft parts are never completely perforated; the bones are never denuded, the teeth seldom drop out.	"The soft parts are often perforated; the bones are always denuded; the teeth are invariably loosened, and often drop out.
"The course of the disease is slow if left to itself; it is cured rapidly by appropriate treatment.	"The course of the disease is rapid and invariably fatal if left to itself, often even in spite of all treatment."

(Vol. ii, p. 149.)

In their extremely accurate description of stomatitis, they chiefly fol-

low M. Taupin, who contributed a very valuable paper on the subject to the 'Journal des Connaissances Medico-Chirurgicales.' They recommend the application of the dry chloride of lime, or of powdered alum to the ulcerated gums, washing it off after it has remained in contact with them for a few minutes; a suggestion on which we have acted with very good result. They have met with twenty-seven cases of cancrum oris, and have thrown much new light on the morbid anatomy of the disease, of which they treat at considerable length. On examining parts which have been the seat of this affection, the whole of the cheek or lip is found swollen, shining, of a greenish or violet colour, hard to the touch, and presenting a deep-seated circumscribed engorgement. At the most prominent part of this swelling there is often a round or oval eschar, with defined edges, and varying in size from that of a pea, to that of a crown-piece. This eschar is for the most part quite dry, and of the consistence of parchment, and extends through the whole depth of the skin, but seldom involves the subjacent tissues. The mortification of the skin is not invariably met with, but the mucous membrane of the mouth is always gangrenous in a greater or less extent. Sometimes there is an elongated ulceration, with defined edges, and a blackish gray fundus, occupying the base of the lower gingivo-buccal fold, or, more frequently, that part of the internal surface of the cheek which corresponds to the interval between the dental arches. At other times the gangrenous surface is much more considerable, involving the whole or nearly the whole interior of one cheek, which is lined by a black or brown putrilage, that may be removed by scraping with the scalpel, leaving behind shreds of the mucous membrane, in which no trace of organization is discernible. The gums usually share in the destructive process, and the jawbones are in a corresponding extent blackened, sometimes necrosed, and even presenting small portions detached; while the teeth, if they have not already dropped out, may be removed by the slightest touch.

In the slightest degree of this affection, the cellular and muscular tissues of the cheek are infiltrated with serosity, but still preserve their organization unchanged. When the disease, however, has reached a more advanced stage, all the tissues are involved; those parts nearest to the mucous membrane being always the first affected. The brown putrilage mentioned above, is now found to extend four or five millimetres in depth; below it are the cellular and adipose tissue, and the muscles of the cheek all infiltrated with sanious fluid, and tending to become homogeneous, and to lose all the characters of organization, while the adipose tissue near the skin still preserves its natural texture, and is merely infiltrated with fluid. It is indeed comparatively rare to find the mortification involving the whole thickness of the cheek or lip, for usually a portion of infiltrated and hardened tissue separates the eschar of the skin from the gangrenous mucous lining of the mouth. Still, if the disease advance, a time does come when the gangrene affects the whole thickness of the parts; the eschar then becomes detached, and perforation of the cheek results.

The statements of former writers with reference to the condition of the vessels and nerves in this affection are very vague; some saying that they present nothing remarkable, while others assert that they become so confounded with the other tissues, as to render it impossible to distinguish

them. To the elucidation of this subject MM. Rilliet and Barthez have devoted considerable attention; and present the following statements as the result of a careful dissection of six cases, in which this point was particularly examined:

"We have ascertained that if the tissue through which the vessels pass is simply infiltrated, but not in a state of gangrene, they are then perfectly healthy, permeable; with, perhaps, very slight thickening of their parietes; if they be running at the edge of the gangrenous parts, (we met with this condition only in one patient, and in the facial vein, having forgotten in this case to examine the artery,) they are still permeable, but their walls are thickened, and are beginning to assume the appearance of gangrenous parts. Even when they traverse the gangrenous tissues it is still possible to find them, and to trace the facial vein and artery through the disorganized parts, into the healthy structures beyond. The cavity of the vessel is then found to be occupied by a clot which reaches through the whole extent of the gangrenous parts; or sometimes the clot closes the vessel exactly at the point of its entrance into the mortified tissue, and of its exit from it, but does not extend any further in that direction; forming a cone, the base of which is situated at the edge of the gangrenous parts, while its apex reaches for some distance into the vessel where it is surrounded by healthy tissues. In either case a portion of the vessel somewhat exceeding the extent of the gangrene is removed from the circulation; its thickened walls tend to assume the colour and softness of putrefied parts; and its interior is found to contain a gangrenous putrilage. In the three instances in which we dissected the vessels in the centre of a gangrenous part, we found the arteries thus obliterated, while in two of these cases the vein was still permeable, though full of a liquid putrilage; once its parietes were extremely thickened and soft. We once examined the condition of the nerves, and found that in the midst of the gangrened parts they assumed the colour and appearance of the other tissues. This change, however, had not reached beyond their exterior; their neurilema was gangrenous, but the pulp of the nerves had preserved its natural colour and appearance, and seemed to have resisted the mortification. Once we traced the whole course of the duct of Steno; it continued permeable in the midst of the gangrenous tissues, assuming their appearance where it crossed them, and opening into the mouth by a free orifice in the midst of the putrefied remains of the mucous membrane." (Tome ii, p. 132-3.)

Their investigations lead them to the opinion that cancrum oris always commences in the mucous membrane of the mouth; though they would not deny the possibility of its commencing in the tissues intermediate between the skin and mucous membrane, since the high authority of Richter asserts that to be sometimes the case. The condition of the vessels they regard as a consequence, not as the cause, of the gangrene. For their faithful portraiture of the symptoms of the disease, we must refer our readers to the work itself; since many other interesting topics demand a notice.

Croup. The chapter on croup is enriched by an essay on tracheotomy from the pen of M. Trousseau; which is extremely valuable as embodying the results of the experience of a man who has performed the operation 121 times. It is customary in our own country to regard tracheotomy as an operation in itself extremely hazardous, and consequently to defer its performance in cases of croup until all other remedies have been had recourse to without avail. M. Trousseau combats this opinion, and appealing to the favorable results of the operation when performed for the removal of a foreign body from the trachea, as contrasted with its fatality when practised for the relief of chronic inflammation of the larynx, he concludes that it is not in itself dangerous; though it may

become so when its performance is delayed till after symptoms of asphyxia have existed for a considerable time. He infers therefore that in all cases of croup, the operation should be performed so soon as we can feel tolerably certain of the presence of false membranes in the larynx. By so doing two advantages are secured, for we do not have to contend against the altered state of the blood, and the engorgement of the lungs and cerebral congestion which exist in advanced stages of croup; and secondly, the false membranes will probably be found to be less extensive, and the applications resorted to for their removal will be more efficacious. He next discusses the comparative merits of tracheotomy and laryngotomy, and decides in favour of the former; partly because by it the air-passages are opened lower down, and the chances of arresting the extension of the false membrane to the bronchi are thus increased. Another reason in its favour, and to which he attaches greater weight is this, that the canula which it is indispensably necessary to introduce into the air-passages, usually excites violent inflammation of the edges of the wound, and almost always induces the necrosis of the cartilages in its immediate neighbourhood. This occurrence is of small importance when it involves the rings of the trachea, for the necrosed portions can be easily removed, and their loss does not cause any contraction of the tube; but far more serious consequences would result from the larynx being thus affected, since after the cure of the croup, the patient would have to undergo all the various evils produced by necrosis of the thyroid and cricoid cartilages. There would be their chronic inflammation and suppuration to combat, with much reason to apprehend that the larynx might remain permanently deformed, or that the tumefaction of the mucous membrane might cause dyspnea as serious as that which the croup had produced, or at least that the voice would ever after be seriously impaired. With reference to the greater danger that is supposed to attend tracheotomy, M. Trousseau remarks that of 121 patients on whom he performed this operation, only one died during its performance, and in that instance the patient died in a fit before the first incision was completed.

It is M. Trousseau's custom in performing the operation, if he finds it impossible to avoid the thyroid veins by careful dissection, to divide them without tying, since the hemorrhage always ceases on the introduction of the canula; while tying them not only lengthens the operation, but is attended with some danger of inducing phlebitis. As soon as he has completed the incision into the trachea, he introduces an instrument to keep the edges of the wound apart, raises the child from the recumbent posture, and waits for a few moments till the hemorrhage ceases. He then, if the case is very urgent, immediately introduces the canula; if the symptoms are less pressing, he allows the dilator to remain for some time, in order to afford opportunity for the expulsion of the false membranes; while he further endeavours to favour their discharge by dropping water into the bronchi, and by sponging out the trachea repeatedly. He prefers the curved canula of M. Bretonneau, and the bivalved canula of M. Gendron to any others hitherto invented, though for adults and for all children except those who are very young, it is advisable to use a double canula. This ought to be sufficiently long to enter to a depth of two centimetres into the trachea; for by the second day after the operation; the swelling of the soft parts around the wound will prevent it from

entering more than five or six millimetres, and then if the canula were not sufficiently long, it might be displaced during the efforts of coughing. As often as the respiration becomes difficult, the canula must be removed, if there be any reason for referring the dyspnea to any obstruction in the tube. Usually it is sufficient to change the canula twice in twenty-four hours; when a double canula is employed, the inner one must be removed every three hours, which may be done without causing the slightest annoyance to the patient. At the time of withdrawing the canula, the dilator should be introduced, and while the edges of the wound are thus kept apart, the trachea should be sponged out, and the medicated applications employed. In the course of two or three days the use of the dilator becomes unnecessary, the edges of the wound continuing open of their own accord. It is a matter of great importance to withdraw the canula at as early a period as possible. If the case should advance favorably, the same sedulous care to keep the canula free becomes unnecessary after the fourth or fifth day; and if the air should appear to pass at all by the larynx, a canula may be introduced incompletely closed by a little plug of cork. If respiration still go on well, the caliber of the canula may be reduced every day until it is finally removed, which may usually be done from the tenth to the thirteenth day. Once he succeeded in removing it as early as the fourth day, and once he was compelled to allow it to remain until the fifty-third day.

M. Trousseau does not rely for success solely on the opening the trachea, and introducing the canula, but he attaches great importance to the employment of topical remedies. These consist in dropping into the air-passages, fifteen to twenty drops of a solution of about five grains of nitrate of silver in an ounce of distilled water, and at the same time cleansing out the trachea with a sponge dipped in a solution of one part of nitrate of silver in five of water. This process he repeats four times the first day, three times the second, once or twice on the fourth, and then suspends its employment altogether.

He concludes with some interesting remarks on the prognosis in these cases which we would fain extract, but must content ourselves with referring to them at page 379 of vol. i. The results of this plan of treatment naturally excite our curiosity. They are by no means brilliant. M. Trousseau has operated on 112 croup cases, in 27 of which the patients survived; and if to these we add those cases in which other surgeons have pursued a similar plan, we obtain a total of 150 cases; 39 of which, or rather more than one quarter, had a favorable termination. It cannot, however, with any fairness be assumed that in all of these 39 cases, the patient's life would have been sacrificed but for the operation. The very reverse of this, indeed, is probable, for the old pupils of M. Bretonneau, of whom M. Trousseau is one, often resort to the use of tracheotomy in cases of croup, without employing any previous treatment with the exception of the local application of caustics.*

Cerebral Hemorrhage. The second volume contains a very valuable essay on cerebral hemorrhage in children, a subject that has not re-

* Some sensible remarks on this premature employment of tracheotomy are contained in the Bullétin Général de Thérapeutique for October, 1842, on occasion of two cases operated on without any previous treatment, related in the Journal de la Société Médicale d'Inde et Loire.

ceived all the attention which it deserves, since many peculiarities distinguish the different forms of this disease in the child, from the same forms in the adult. Hemorrhage may occur in all situations within the cranium; as between the skull and dura mater, between the dura mater and arachnoid, into the cavity of the arachnoid, into the tissue of the pia mater; or into the substance of the brain, or the cavity of the ventricles. Of all these forms the most frequent, and from its frequency the most important is the hemorrhage into the cavity of the arachnoid. It has nevertheless been overlooked by many writers, and but slightly noticed by others; probably in some instances owing to the fact that the effused blood undergoes changes which assimilate it in appearance to false membrane, for which it has been mistaken by some observers. MM. Rilliet and Barthez base their remarks on twenty observations, seventeen of which came under their own notice, while for the particulars of the remaining three, they are indebted to a friend. From an examination of these cases it appears, that pure, unchanged blood, is seldom found in the cavity of the arachnoid; it usually undergoes rapid alterations; the serum separating from the crassamentum, while the latter becomes by degrees converted into a thin, elastic, false membrane, which sometimes resembles the arachnoid; at other times closely resembles a fibrous membrane. The first form in which the clot is found is that of a dark-red, almost black, coagulum, of varying extent, usually thicker at the centre than the circumference, adherent to the arachnoid, (almost always to its parietal layer,) but easily detached from it, and leaving the serous membrane, with which it had been in contact, smooth, polished, and unaltered. Sometimes there is but one clot; at other times there are several; in either case the edges often extend into a thin, yellow, or transparent false membrane; so thin indeed that at first sight its edges cannot be distinguished, and it might be confounded with the arachnoid, and lead to the supposition that the effusion of blood had taken place between the arachnoid and dura mater, if it were not found that the clot and false membrane are removed together. This continuity of substance between the clot and false membrane points out the common origin of the two, and warrants the conclusion that the latter is identical with the former; its apparent difference being merely the result of the absorption of the colouring matter of the blood. This is most clearly seen to be the case, whenever portions of coagulum are interspersed through different parts of the false membrane. Clots of a deep-red colour, a thick very lacerable membrane of a reddish-yellow colour, and infiltrated with serum, and a thin, more transparent, and less coloured false membrane, then, make up one continuous layer. It often happens that in the course of time, the thin, delicate, false membrane grows opaque and resisting, and, assuming a pearly lustre, altogether loses its resemblance to the arachnoid, but presents instead considerable similarity to the dura mater. This change is probably brought about by the deposition and subsequent alteration of successive layers of blood; at least MM. Rilliet and Barthez have found membranes of this kind presenting a distinctly-stratified structure in the adult, though they have not met with any well-marked specimen of it in the child. Clots and these false membranes for the most part coexist, and are found usually on the convex surface of the brain, sometimes on its plane surface also, but never on that alone. They are

generally present on both hemispheres, and do not occur on one side more frequently than on the other. Sometimes they are perfectly dry, but in the majority of cases the cavity of the arachnoid contains some fluid, which varies much in colour. This fluid is seldom present in any large quantity, and the cases in which it is abundant are those of very young children, in whom the ossification of the skull is incomplete. In one instance of this kind, the arachnoid cavity contained nearly a pint, in another, nearly a quart, of fluid, and such an occurrence constitutes one form of chronic hydrocephalus.

The symptoms of the affection are extremely obscure, except when the effusion of fluid gives rise to hydrocephalus, when diagnosis is aided by the sensible enlargement of the head. In this case, however, though important, it is often very difficult to distinguish between chronic hydrocephalus arising from other causes and that which proceeds from sanguineous effusion, since the hemorrhage may occur at different times, and the enlargement of the head may consequently take place gradually. The symptoms of ordinary chronic hydrocephalus develop themselves more slowly than those which result from meningeal apoplexy, and it will likewise help diagnosis if further observation should substantiate the authors' statement, that meningeal apoplexy never occurs in children more than two years old, while chronic hydrocephalus from other causes is by no means rare above that age.

Hemorrhage into the substance of the brain, so frequent an occurrence in the old subject, loses much of its importance in the child. It does not happen half as often as hemorrhage into the cavity of the arachnoid, and is of comparatively small moment, being generally a secondary phenomenon, supervening in the course of some disease which would in itself prove fatal to life, and taking place only a few days before death. Sometimes, too, it is completely latent, and the morbid anatomist is the first to discover the existence of a lesion, which had escaped the observation of the practitioner. It may occur as capillary apoplexy, or a circumscribed extravasation of blood may take place ; but it is seldom that either form exists uncomplicated with tubercular deposit, or meningitis, or some other disease of the brain. Its symptoms when it occurs in the idiopathic form are most various and uncertain, and altogether unlike those which characterize apoplexy in the adult; while apoplectic symptoms have existed in some instances during life, where a post-mortem examination has failed to discover any trace of effusion of blood. In the secondary form, too, the symptoms are not more decisive.

Perhaps we cannot go further in the differential diagnosis of the various forms of cerebral hemorrhage, than the mere statement that convulsive symptoms more frequently attend hemorrhage into the membranes, and inflammatory symptoms hemorrhage into the substance of the brain. The diagnosis of cerebral hemorrhage from other affections of the brain is scarcely more easy; for the convulsive form may be confounded with idiopathic convulsions or with those dependent on the presence of cerebral tubercles; the inflammatory form with certain cases of softening of the brain and encephalitis or meningitis; when attended with paralysis that symptom may be referred to softening of the brain, and the hydrocephalus which sometimes results from it may be confounded with ordinary chronic hydrocephalus of the ventricles of the brain.

Among the causes of cerebral hemorrhage there are scarcely any more influential than obstruction to the circulation, however produced. Hence compression of the superior vena cava by enlarged bronchial glands, or of any of the large venous trunks by enlargement of some of the abdominal viscera has a strong tendency to induce it. Sometimes it is the result of disease of the sinuses of the dura mater, at other times it follows the injudicious repulsion of eruptions on the scalp. Occasionally it occurs suddenly, and in children in perfect health; but usually it is associated with a debilitated state of the system, and is very often connected with tubercle, the deposit of which in the brain suffices in many cases for its production without the concurrence of any other cause.

TUBERCULOUS DISEASE. There are many more subjects treated of in the first two volumes on which we had wished to lay MM. Rilliet and Barthez's remarks before our readers, but we must forbear, for the third volume, which is wholly occupied with an account of the different forms of tuberculous disease, requires, even for the most cursory analysis, far more space than we can allot to it. The first 160 pages are devoted to general observations on tuberculous disease, which the authors assert, in opposition to the opinion of many writers of celebrity, to be identical with scrofula. In support of this opinion they allege, that having examined the bodies of a very large number of children at the Hôpital St. Louis and Hôpital des Enfans, they never met with a single instance in which tubercle was not present in some organ or other. They propose, therefore, rejecting the term scrofula from medical nomenclature altogether, and substituting that of tuberculization.

After some very interesting details with reference to the morbid anatomy of tubercle, we find the authors, at p. 46, distributing the 312 cases that form the basis of their remarks into three categories: of which the first, comprising more than the half of the cases, includes all those instances in which death was evidently attributable to the tubercular degeneration; the second, to which about one fourth of the cases may be referred, comprises those in which the extent of tuberculous deposit was inconsiderable, and evidently not the cause of the fatal event; and the third comprises those instances in which the amount of tubercular deposit was intermediate between the other two.

The authors find, on examining these three classes with reference to sex and age, that there is but little difference between them in respect of the former, but that abundant tubercular deposit is much oftener met with from six to fifteen than from one to five years of age; that the mean amount of tubercular deposit is oftenest found from one to two, and next in frequency from three to five; and that from three to five and a half years of age very scanty tubercular deposits are more frequently found than at any other period of childhood. In classing the different organs according to the frequency with which they become affected by tubercle, they arrange them in the following order: the lungs, the bronchial glands, then, at a great distance beneath them, the mesenteric or abdominal glands and the small intestines. After these organs come the pleuræ and spleen, then the peritoneum, the liver, the large intestines, the membranes of the brain, the kidneys, brain, stomach, and pericardium. Very nearly the same order would be observed in a classification of the organs according to the extent of disease in each; for those which are oftenest

the seat of tubercle are usually the seat of its most abundant deposit. The same order, too, would hold good with reference to those organs in which tubercular deposit deposit most frequently coincides with the same disease in other parts. Tubercle is not unfrequently found exclusively confined to the thoracic organs, and it is not very unusual to meet with it only in the abdominal viscera. It sometimes exists in the brain, and nowhere else; but it is very rare to find it in the brain and abdomen but absent from the chest.

The presence of tubercle in the system betrays itself by very different symptoms, according to the organ which is its seat. It may, however, be stated generally that it runs either an acute or a chronic course, and that the acute form is either simple or assumes a typhoid character. The acute form is usually found, on a post-mortem examination, to be associated with the presence of gray or yellow granulations, or with small, isolated, miliary tubercles, seldom with softened or cretaceous tubercle, and seldom with other than very small cavities in the lung. Sometimes, however, large masses of tubercle are met with, which by their rose-coloured hue indicate their recent formation. The tubercular deposit in this form is usually general, though one organ in particular may be its especial seat. When the symptoms assume the typhoid character the prostration of strength is very marked, and the child lies almost in a state of stupor. The gums bleed, and they, as well as the teeth, are incrusted with sordes; the tongue is seldom universally moist; usually it has a great tendency to become dry, while at the same time its edges, or even its whole surface, are red; and the abdomen is large, tympanitic, and tender on pressure.

"Lenticular spots are seldom present; or if they exist they are but few, not very apparent, and do not persist long. The delirium may be severe and of long continuance; at other times the oppression is very great, although auscultation may not detect any or but few symptoms of thoracic disease. These typhoid phenomena may last during the whole course of the disease; but sometimes they appear during the course or at the termination of the simple acute form, when they last only a few days." (Tome iii, p. 75.)

The duration of the acute form of tubercular degeneration varies greatly; a fatal termination sometimes occurring in sixteen or eighteen days, at other times not till after sixty or eighty from the first manifestation of the symptoms. Tubercular deposit in the membranes of the brain runs its course most rapidly, and that which involves the lungs most slowly. General tubercular deposit, without predominant affection of any one organ, runs its course, in the majority of cases, in from twenty-five to fifty days.

The chronic form is characterized anatomically by the presence of all the different forms of tubercular deposit; by softened tubercles and tuberculous cavities. The local symptoms attending it are much more marked than in the acute form, and usually indicate tolerably plainly the organ which is the chief seat of the disease. It generally runs its course in from three to seven months.

Bronchial Phthisis. The authors were not placed in such circumstances as to enable them to throw much additional light on the causes of tuberculous disease. We therefore pass on to the subject of bronchial phthisis, to the symptomatology of which, especially, they have

made a very valuable contribution. The essays of previous writers on tubercle of the bronchial glands are valuable almost entirely for their anatomical details; and in our own country the disease has been passed over almost without notice, except by Sir James Clark, who devotes some pages to it in his work on Consumption. But, neglected though it has been, it merits the most careful examination, since it is one of the gravest and most frequent maladies incidental to childhood.

Tubercle may be deposited in almost any form in the bronchial glands, but its deposit most frequently takes place as tubercular infiltration, and usually commences in the centre of the gland. When the whole of the gland has become involved in the disease its size is considerably increased; and glands exterior to the substance of the lung often become as large as a chesnut, but those imbedded in its tissue never exceed the size of an almond. The tuberculous matter is inclosed by a thin cyst, the inner surface of which is seen to be supplied with a delicate network of vessels; but as the tubercle softens the parietes of the cyst grow thicker, and may after a time be divided into two layers. This softening occurs at various periods: it for the most part commences at the centre of the gland, but sometimes it begins at its periphery, and in some instances the changes seem to take place simultaneously in its whole substance. The softened tubercle is generally discharged from the system by the formation of a communication between the cyst and surrounding organs, but in some very rare cases the contents of the cyst become absorbed, and it is found perfectly empty. Another change which may take place is the transformation of the tubercle into cretaceous matter; it almost invariably happens, however, that a small part only of a diseased gland is thus transformed, the tubercle in the rest of its substance remaining unaltered. While these morbid processes are going on in the glands themselves, one of two effects may be produced on the neighbouring parts: either they are compressed by the gradual enlargement of the glands, or intimate adhesions form between them and the glands, and perforation of their substance eventually takes place. The large glands may compress the vessels, or the air-tubes, or the pulmonary tissue. Serious results, however, from pressure on the vessels occur less frequently than might have been expected; and MM. Rilliet and Barthez have not met with an instance in which anything approaching to obliteration of the bronchi had been produced by the pressure to which they had been subjected. Compression of the trunk or branches of the pneumogastric nerve is a frequent occurrence; associated with which the writers have observed a spasmodic cough, resembling hooping-cough, (on the diagnosis of which we have already quoted their observations,) various modifications of the voice, and a diminution of it amounting to almost total aphonia; and twice they witnessed very distressing attacks of asthma result from it, but in no instance have they observed it produce spasm of the glottis, as in the cases recorded by Dr. H. Ley.

Instances are on record in which the œsophagus and the large vessels of the chest have been perforated by tubercular bronchial glands; but the air-tubes are, beyond comparison, most frequently subjected to this lesion:

"The bronchi being unable, like the vessels or the œsophagus, to escape compression, it often happens that adhesions more or less intimate form between them

and the surrounding glands. These adhesions are formed through the medium of a cellular tissue, which, though originally loose, becomes daily denser and denser. Sometimes, too, vessels sufficiently large to be seen by the naked eye form a communication between the gland and the bronchus. At this period the gland may still be detached, and the external surface of the bronchial tube with which it was in apposition will be seen vividly injected. In course of time this adhesion becomes so intimate that it is impossible completely to remove the gland, and the surface of the bronchus beneath it is found, in a few cases, to present a marked depression." (Tome iii, p. 171.)

This union between the two organs being once established, a series of changes take place, which result in the softening of the tuberculous matter, and in the communication of the interior of the cyst with the bronchial tube; but the mode by which the communication is effected is not in all points satisfactorily ascertained. The extent of the perforation of the bronchus for the most part bears a direct proportion to the degree of softening of the tubercle; but the occasional occurrence of perforation of the tube while the tubercle in the diseased gland is in a state of crudity, would lead to the inference that it may result from interstitial absorption, produced by the long-continued pressure of the diseased gland. Various indeed as the appearances are which perforated bronchi present, it may be doubted whether the perforation is not always the result of the same process, namely, of interstitial absorption from pressure. According to MM. Rilliet and Barthez—

"The character of the perforations varies according to whether they are of recent or of old standing; whether they communicate with a cyst filled with softened tuberculous matter, or are in contact with tubercle in its crude state. In the latter case the edges of the perforation are sharp, nearly circular, and usually present no traces of injection. In the other case, on the contrary, the wall of the bronchus in contact with the cyst is of a bright red, worn from without inwards, and the perforation presents irregular edges, in which some remains of the cartilaginous rings may be distinguished." (Tome iii, p. 171.)

Glands most variously situated may thus communicate with the bronchi. Sometimes the glands remote from the lung and surrounding the large bronchial tubes communicate with their cavities; at other times the bronchi are perforated by glands situated in the substance of the lung. In this case "a communication seems to be established between the substance of this organ and the cavity of the gland, and a section dividing these two parts shows the parenchyma of the lung traversed by cavities the walls of which are formed by carnified pulmonary tissue. These cavities, which communicate freely with the bronchial cyst, are lined by a false membrane, exactly similar to the red, uneven, thick lining of the cyst itself." (Tome iii, p. 173.) The nature of these cavities has been disputed, for it is possible that they may be formed by a destruction of the pulmonary tissue itself, though the opinion of the authors seems to us more probable—that they are produced by the softening of small subdivisions of the tuberculous gland which had been imbedded in the substance of the lung.

Serious difficulties attend the investigation of the symptoms which accompany this disease. These difficulties arise in great measure from the circumstance that tuberculization of the bronchial glands is seldom met with alone, but is for the most part associated with similar changes of the lungs and pleura, which render the symptoms complex and uncertain.

We do not know that we can present the symptomatology of bronchial phthisis in a clearer or more condensed form than that in which it has been done by the writers themselves:

"The bronchial glands, when tuberculous, form a more or less voluminous tumour, that interferes with the functions of the different organs with which it is in contact. Thus, by compressing the superior vena cava, they may occasion, 1, œdema of the face; 2, dilatation of the veins of the neck; 3, a livid colour of the face; 4, hemorrhage into the cavity of the arachnoid.

"From the compression of the pulmonary veins there may result, 1, hemoptysis; 2, œdema of the lung. When the glands compress the pneumogastric nerve there may arise, 1, various alterations in the tone of the voice and of the cough; 2, fits of coughing similar to those of hooping-cough; 3, attacks of asthma, which, under other circumstances, are most unusual in children.

"The action of the glands on the lungs and bronchi is extremely remarkable. By compressing the air-tubes they occasion, 1, Loud, very persistent, sonorous râles, which sometimes are very singular in their tone and character; 2, they impede the circulation of the air, and thus occasion obscurity of the respiratory sound. This phenomenon may also depend on the œdema which is produced by the compression of the pulmonary vessels.

"The action of the glands on the bronchi, however, is not confined to the compression of those tubes, but they serve also as conductors of the vibrations of sound. Hence result the following phenomena. 1st. Although the lung may be almost or altogether healthy, various modifications of the respiratory sound may yet be heard in different parts of the chest, such as prolonged expiration, bronchial respiration, and all those sounds which in the normal condition are found in the bronchi, but not transmitted to the ear. 2d. These phenomena are still more striking if there should also exist certain pulmonary lesions, since their stethoscopic signs, even though usually not very marked, will appear to be exaggerated by the presence of the tuberculated glands. Thus crude miliary tubercles may under these circumstances give rise to bronchial or cavernous respiration, or to pectoriloquy; and if they have begun to soften, or are attended with slight bronchitis, distinct gurgling may be perceived. 3d. The stethoscopic sounds arising from the lesion of one lung may be transmitted to the opposite side, and thus excite a suspicion of the existence of a double lesion. 4th. The bronchial glands, in short, owing to their lying in contact with the vertebral column, while they also surround the bronchial tubes, transmit directly to the ear all sounds both natural and abnormal which may be found in the lung at points remote from the walls of the chest, and thus seem to exaggerate them. 5th. It is especially at the upper and posterior part of the lungs that these stethoscopic phenomena are usually detected, and it is much less common for them to be heard at the front of the chest.

"All the symptoms just enumerated and which result from the action of the enlarged and hardened glands on the vessels, nerves, bronchi, and lungs, are not constantly present, nor do they all exist at the same time, for their production depends on the situation of the glands and on their enlargement taking place in a particular direction. But, moreover, in cases where these phenomena do exist, they are all liable to very remarkable intermissions; thus, the œdema of the face alternately appears and disappears; the livid colour of the surface is not constant; the changes in the tone of the voice and cough, the paroxysms of coughing, and the attacks of asthma occur on one day and cease on the following day; to recur again after the lapse of a longer or shorter time.

"The stethoscopic signs do not continue always the same, nor do they progressively increase in degree: but bronchial respiration will be heard on one day, while on the morrow nothing more will be perceptible than prolonged expiration, and again on the day following the breathing will have resumed a cavernous character; so that feeble respiration, prolonged expiration, bronchial breathing, cavernous respiration, pectoriloquy, gurgling, and even rhonchus may alternate

with or succeed to each other at various times without any regularity. These variations depend sometimes on the frequency, sometimes on the extent of the respiratory movements, or on the degree of the pulmonary lesion. In most cases, however, there are doubtless many other concurrent causes, of which we are ignorant; for the morbid phenomena that result from the compression of organs by tumours are usually intermittent.

"If the bronchial tubercles are softened and communicate with the bronchi, all the symptoms just enumerated do not exist, because the tumours which are generally smaller are situated in the substance of the lung, and are no longer in contact with the vertebral column: hence neither cavernous breathing nor gurgling are any longer audible, unless tubercular cavities exist in the lung itself.

"The character of the expectoration is seldom or never of any great service in assisting us to form a diagnosis.

"The phenomena which may be observed result almost entirely from the ulceration and perforation of the organs with which the glands are in contact, and in the present state of our knowledge we are not acquainted with anything capable of indicating that they depend on the glands and not on the lung. Thus perforation of the lung occasions pneumothorax, that of the pulmonary vessels furious hemoptysis, and the formation of a communication between the œsophagus and the bronchi or trachea by the bronchial glands, may occasion violent paroxysms of cough whenever the patient attempts to swallow liquids." (Tome iii, pp. 198-201.)

The results of percussion vary much; perhaps it yields no sign so frequently as increased dulness of the interscapular region, but this so often corresponds with various alterations in the respiratory sounds that it may give rise to a suspicion of the existence of pulmonary phthisis. Two circumstances, however, will generally suffice to preserve from error: first, the fact that in bronchial phthisis the diminution of resonance is permanent, while the results of auscultation differ at different times; and second, the want of correspondence between the indications furnished by auscultation, and the extent and degree of the dulness; so that, for instance, bronchial respiration may be heard in a situation where the resonance is but very slightly diminished.

Valuable as these remarks are, they still leave the subject in much obscurity, though no better rules for diagnosis could be laid down than are contained in the following paragraph:

"If we observe cough, emaciation, fever, and sweats occur in a child from three to four years of age, without our being able to detect any physical signs of tubercle in the lungs, or to discover any indication of tubercle either in the brain or the abdomen, we may then suspect its existence in the bronchial glands. This presumption would amount to certainty, if we were to notice an alteration in the character of the cough, such as its occurring in short paroxysms, but without being attended with hooping or vomiting, or its becoming hoarse; if we were to hear large ronchus in the trachea, or very persistent sonorous or sibilant *râle*, if we were to observe asthmatic attacks, or very marked but intermittent changes in the voice, or œdema of the face, provided that we had ascertained that this latter phenomenon did not depend on some other cause, such as disease of the kidneys. Great attention also ought to be paid to the signs furnished by auscultation or percussion. As has already been mentioned, they are remarkable for their intermittent character. It is especially the changeableness of the signs yielded by the use of the stethoscope compared with the persistence of those elicited by percussion, which must form the basis of our diagnosis. Great importance must also be attached to the situation in which changes of the respiratory sounds are detected. The signs of bronchial phthisis are perceptible almost exclusively at the upper part of the lung, and prin-

cipally in the interscapular space, on a level with the root of the bronchi; they are also occasionally, but much less often, perceptible in front. In adults such a distinction would perhaps be of no great service, since in them tubercular deposit occupies almost exclusively the summit of the lung, but this is not the case in the child, but the tubercles are often scattered through various parts of the lung, or if they occupy its upper part auscultation beneath the clavicles will reveal their existence. Whenever, therefore, in a child affected with some chronic pulmonary complaint, the signs of tubercles are discovered in the interscapular space, there will be reason to conclude, if they vary in their degree and fluctuate in their progress, that they depend on tubercular degeneration of the bronchial glands." (Tome iii, p. 204.)

PULMONARY PHTHISIS. They next pass to the investigation of tubercle in the lungs of children; and here we may notice a very important remark with reference to the stethoscopic signs of their existence, the truth of which we can fully confirm from our own experience. It will be found that some of those physical signs from which we should without hesitation conclude that tubercular degeneration of the lungs existed in the adult, do not always indicate the same serious mischief in the child. Thus, for instance, that unusually harsh respiration which in the adult is so valuable a sign of the presence of crude tubercle in the lungs, loses much of its value in the child from the circumstance that it may exist even when the lung is perfectly healthy; and that it often is not sufficiently confined to one spot to warrant our drawing any conclusion from it. The subclavicular region is that in which this coarse respiration is most frequently heard, even in children whose lungs are perfectly sound; in the same situation, too, the expiration is often considerably prolonged, without there being any pathological condition which could account for this phenomenon; and great doubt is thus thrown over two of the most valuable indications of the early stage of phthisis.

The occurrence of severe pneumonia in the course of phthisis appears to be more frequent in the child than (judging from the remarks of M. Grisolle and M. Louis) it is in the adult. It may supervene as a complication either of the acute or chronic form of phthisis. In the former case it is sometimes coeval with the earliest symptoms of tubercle, but oftener it does not occur until after such symptoms have existed for some time. In the latter case intense fever and heat of skin, with a full and hard pulse and all the indications of acute inflammation suddenly come on. The cough, previously slight, becomes all at once very frequent, the oppression of the breathing is intense, and auscultation detects moist sounds through the whole posterior part of the lung, or perhaps even bronchial respiration. After these symptoms have existed for some time either the patient dies or a degree of remission takes place in the symptoms, which, however, continue in the main the same. Fever is still present, but the pulse has become small, the face has grown pale, and the child, who before the attack was not all emaciated, loses flesh rapidly. Auscultation continues to yield the same results; moist sounds are present in abundance; the bronchial respiration, dulness, &c. vary in degree, but do not altogether disappear, and the patient dies in two or three months. Sometimes the pneumonia is very extensive from the outset, and then it proves fatal much more rapidly; but usually successive attacks take place, the hepatization of the lung gradually extending with each recurrence of the inflammation till it proves fatal.

When pneumonia supervenes on the chronic form of phthisis, it usually terminates in death after a few days, seldom lasting longer than a fortnight. A sudden exacerbation of all the symptoms is observed accompanied often with a tinge of blood in the expectoration, and with pain of a pleuritic character. The moist sounds which before might have been heard over a small surface now become more abundant and more extensive, bronchial respiration is perceived through the whole posterior part and base of the lung, and death ensues after some days.

There is besides a latent form which pneumonia assumes in some of these cases, that hardly betrays itself by any symptoms. The patients gradually lose their strength, and become unable to leave their bed, but without any great increase in the fever, cough, or oppression, though the prostration of their strength is very marked. Auscultation is probably neglected from the fear of distressing the patient; and when he dies, after the lapse of a few days, very extensive pneumonia is discovered, the existence of which had not even been suspected.

Mesenteric Phthisis. The error which regards the tabes mesenterica as an extremely common disease of childhood is by no means confined to the vulgar. A similar opinion is expressed by many authors, who have not only confounded a number of different affections—as tubercular peritonitis, enteritis, ulceration of the intestines, &c.—under one common name, but have also regarded as morbid the large abdomen natural to childhood. The presence of slight tubercular deposit in the mesenteric glands is, it is true, far from being a rare occurrence, since MM. Rilliet and Barthez found it in half of their post-mortem examinations of tuberculous children. The number, however, in which this tubercular deposit was so considerable as to be of much moment was far smaller, not exceeding one in sixteen. MM. Rilliet and Barthez have satisfied themselves that serious mesenteric disease hardly ever exists in children under three years of age, that the affection is always slight in proportion to the youth of the children, that it is most severe between the fifth and tenth years, and from the twelfth to the fifteenth year is extremely rare in any form, either trivial or severe.

The symptoms that attend the disease are by no means definite; for the functional disturbances to which it gives rise are common to it with many other affections, while the general indications of the existence of tubercular disease are often less marked in this than in other forms of phthisis. It might indeed be supposed that the tuberculous mesenteric glands would give rise, by their enlargement, to derangements similar to those which result from the diseased bronchial glands. This, however, is not the case, for the abdominal parietes, unlike those of the thorax, are soft and yielding, and allow the glands to acquire a considerable size and to approach the anterior part of the abdomen without forming adhesions with neighbouring organs. The adhesion, too, of the bronchial glands is favoured by the firm and solid character of many of the organs contained in the thorax with which they are in contact; but no such resistance is offered by the intestines, which, from the ease with which they change their position, constantly avoid compression. Hence, until the glands have acquired so large a size as to be perceptible through the parietes of the abdomen, the diagnosis of the disease is attended with much difficulty.

In the early stages of the disease there is no change in the form of the abdomen, and at a later period its increase in size is by no means an invariable occurrence; sometimes, indeed, it is retracted, and shrinks under pressure. It is true that usually as the malady advances there is some increase in the size of the abdomen; but this symptom is common to it with many other affections, and exists, as M. Guersent has remarked, as a natural condition in weak and rickety children. Even when the tuberculous glands have acquired a considerable size it is not always possible to distinguish them through the abdominal integuments. When they can be distinguished they will always be felt in the neighbourhood of the umbilicus, forming a tumour, whose surface, more or less irregular, is evidently composed of several masses agglomerated together. Their situation sometimes appears to vary, owing to the varying tension of the walls of the abdomen, according as the intestines are full or empty. The state of the tongue and bowels, the appetite, &c. and the pain which is present in the abdomen are not peculiar to *tabes*, and, consequently, render us no service in forming a diagnosis. An exception to this statement perhaps should be made with reference to the enlargement of the superficial abdominal veins, which, if there do not exist enlargement of the liver or chronic peritonitis, must at once lead to the suspicion of tubercle of the mesenteric glands.

The preceding remarks show how obscure are the local symptoms of mesenteric disease. Nor are the general symptoms less so, they being those of tuberculous disease in general, but of a rather mild character. The course of the disease is probably slow, but the obscurity of the early symptoms renders it difficult to fix the date of its commencement, and in its course it almost always becomes complicated with other forms of tuberculous disease, or else some intercurrent inflammation, as peritonitis, accelerates the fatal issue.

Nearly allied to tabes mesenterica, and not unfrequently confounded with it, is the tubercular disease of the peritoneum. Like it, too, the symptoms that betoken its existence are usually obscure. The summary of them given at p. 389, of vol. iii, we had purposed extracting, but we are prevented by want of room.

In its present form we can conscientiously recommend MM. Rilliet and Barthez's work to all who, possessing a tolerable familiarity with children's diseases are anxious to perfect their knowledge, and who will not be deterred from seeking truth by the labour of some digging to arrive at it. The book wants something, however, besides mere condensation, before it will be altogether suited for beginners. The most elaborate analysis of symptoms does not suffice to convey a correct impression of the nature of any disease. It is the talent of combining details so as to produce a vivid portraiture, that is most needed in a work intended to teach the beginner. In this, the writers have not been so successful, but we believe them to possess every qualification for the task, and we hope before long to congratulate them on having achieved it.

Art. II.

1. *Statistical Reports of the Sickness, Mortality, and Invaliding among the Troops.* Compiled by Major Tulloch, *and presented to Parliament,* 1838-41.

2. *Statistical Reports on the Health of the Navy from* 1830 *to* 1836. Compiled by Dr. Wilson, *and ordered by the House of Commons to be printed,* 1840-1.

On various occasions we have brought under the notice of our readers the valuable statistical reports on the health of the army and navy, and have reviewed in detail the leading facts which they tend to establish. We now propose to institute a comparison between the sickness and mortality in these two branches of the public service, and to investigate the causes to which any remarkable difference in this respect is likely to have been attributable.

As a preliminary to this comparison, however, it is necessary to examine those peculiarities in the condition of the soldier and the sailor, by which their health is likely to be affected. Of these the first, and perhaps the most important, is the duration of service. The soldier must enlist for life, or until he is by age or disease unfit for military duty, while the sailor engages only for a limited period, and as ships are generally paid off after being about four years in commission, he is then at liberty to terminate his engagement.* The system of unlimited service exerts, we have no doubt, an injurious influence on the health of the soldier, by depriving him of the hope of returning, at a definite period, to his native land, a hope which would probably have the effect of preventing many of those reckless excesses into which he is occasionally led, and would remove that nostalgic depression, which, in the hour of sickness, frequently renders the best efforts of the medical officer unavailing. It follows as a consequence of the limited duration of the sailor's service, that he is more subject than the soldier to frequent medical examinations, at which unhealthy and ineligible men are rejected. When a ship is about to be paid off, the sailors are allowed to volunteer into another without a certificate from the surgeon being required, but they very often, particularly after a long cruise, prefer having their "lark" on shore, and when their money is spent, if they again wish to enter, they must, in the first place, be examined by him and reported fit for service. Thus an opportunity is afforded of getting rid of many men who have become, or are becoming, inefficient, and though all are not necessarily subject to this re-examination, there is reason to believe a very large proportion undergo it. The advantages arising from a selection of lives have been fully ascertained by the experience of assurance offices, and although the same strictness cannot probably be exercised in the selection of seamen, the influence of these repeated examinations must be considerable. In respect of diet, also, the navy has many advantages over the army. Deputy-inspector-general Marshall says,† "The ration of the seaman is not only ample for three meals a day, but these meals may be varied in no small degree, according to the option of individuals, ...the ration of a soldier (in the colonies) will only furnish him with two comparatively scanty meals daily;" and again, "in this country the dinner (of

* This remark applies to the present period of peace. The case was different formerly.

† United Service Magazine for April, 1842, p. 538.

the soldier) is commonly excellent in quality and abundant in quantity, but it is unvarying; the same kind of articles cooked in the same manner from the 1st of January to the 31st of December—

> Que le vent souffle au nord, ou qu'il souffle au midi,
> C'est toujours du bouilli mais jamais du ròti.

At the present time the dinner hour usually is about one o'clock, after which no arrangement is commonly made to furnish the men with any article of food till breakfast next morning, being a period of about nineteen hours," a system which cannot fail to be prejudicial to their health. It is justly remarked in the Naval Report that "variety in diet is gratifying to the palate, facilitates assimilation, and thereby promotes health and vigour."

The influence of exercise in the preservation of health is too well known to require comment, and in this respect the sailor again has the advantage over the soldier; it is true the latter has his drills and parades, but these, like his dinner, present too much sameness; there is not that variety, that calling into play of all the different muscles, which forms a distinguishing feature in the exercise of the sailor. In the article of dress—an important accessory to health, particularly in tropical climates—there is also a marked difference in the two services: the sailor being unencumbered by anything tending to oppress or prevent the free use of his muscles, while the soldier is buttoned up to the throat, which is confined by a stiff leather stock, his head is burdened with a heavy schako, and his well-filled knapsack on his back weighs, with his cross belts and arms, upwards of sixty pounds.

From the nature of the sailor's duties another great difference arises; while the soldier in time of peace usually remains in the same place for one or it may be two or three years, performing the same unvarying routine of parades and duties, and passing his leisure hours in the same dull round of garrison amusements or dissipation, the sailor's life is one continual change of scene, and his duties are of a much more varied nature. He is thus in a measure exempt from that listlessness which, we fear, often leads in the army to intemperance or other equally pernicious vices. Of late a good deal has been done in providing amusements for the soldiers, but we much doubt whether the excellent intentions of the authors of these measures have been sufficiently seconded by the officers of regiments.

No information is given in the Naval Reports as to the average age of the sailors, and we are consequently unable to compare it with that of the army; but from the much greater number of boys employed, from the opportunities the men have of quitting the navy after a few years' service, and which they frequently avail themselves of, and from the high rate of invaliding, there seems good reason to believe that it is considerably under that of soldiers, a circumstance tending very materially to reduce the comparative amount of mortality.

The numerous opportunities enjoyed by the navy of sending home their invalids before disease has made such ravages as to render recovery almost impossible, must likewise assist in diminishing the mortality in that service. Most beneficial effects also arise from the frequent changes between one part of a command and another. On this point Dr. Wilson remarks: "After a certain period of service in the West Indies there is often so much diminution of organic force as to render men of

little original power, or of advanced years, incapable of laborious duty, and to make them more susceptible of disease, acute and chronic. In these cases, and after attacks of severe disease, when convalescence is slow and uncertain, a run to Halifax, or the gulf of St. Lawrence, acts like a charm. Health, strength, and with them spirits, are acquired at a rate scarcely to be believed by those who have not witnessed their progress." (Intr. to Part i, p. viii.) The same remark obviously applies to other commands having the same variety of climate, but even where the difference in that respect is not so marked "there is much reason for believing that frequent change of climate, so far at least as temperature is concerned, is favorable rather than injurious to health; at any rate there is ground to conclude that such change, though it may not lessen—may even augment the number of attacks, weakens the fatal force of disease." (Part ii, p. 149.)

These constitute some of the most important differences in favour of the navy. On the other hand sailors are, from the nature of their duties, more liable to accidents; they are generally more crowded between decks than soldiers in their barrack-rooms, nor have they the same means of ventilation, and when windsails are employed to remedy this defect, the men in their vicinity are compelled to sleep in a constant current of cold air. They are also much more exposed to cold and wet; as the crew in ships of war is divided into two watches, on which alternately the working of the ship devolves for four hours at a time, one half must always be on deck, whilst at midnight, or 4 a.m., the men relieving the watch rush from their beds into the open air, often inadequately covered and perspiring profusely, and thus pass instantaneously from a heated to a cold, or at least comparatively cold, atmosphere, where they remain during the next four hours. The soldier on the other hand is only on guard every fourth or fifth night, and then, though subject to the inconvenience of remaining in his clothes and accoutrements for twenty-four hours, is not altogether deprived of rest, and, when obliged to leave his (often overheated) guardroom to take his turn of duty as sentry, he is exposed only for two hours at a time, and at night is generally defended from atmospheric vicissitudes by his great-coat and sentry-box.

There are other differences in the relative duties and conditions of these two classes which might have been noticed, but as they depend chiefly on locality, we shall advert to them in our remarks on the sanatory condition of the different commands.

To compare the relative prevalence of diseases in each service, it became necessary to adopt the same system of classification for both. We have preferred that followed by Major Tulloch in the Military Reports, and have, at a considerable expense of time and labour, arranged the others in the same manner. In this we have experienced much difficulty, owing to the want of a column in the naval appendices showing the cause of death in those who died in hospitals abroad, and it has only been by a careful and repeated perusal of the reports that we have been enabled to accomplish our task. As it was also necessary that precisely the same periods should be included in both, and as the Naval Reports extend only from 1830 to 1836, we have constructed tables of the sickness and mortality among the troops for these seven years only, so that the ratios will be found to differ in some particulars from those stated in the reports which comprise, in most instances, a period of twenty years.

The naval commands which can be fairly compared with the military, are the home station, the Mediterranean and Peninsular command, and the East India command, for although the last includes New Holland, the force employed there is so limited as not materially to affect the results, and the operations of the squadron are chiefly directed to the shores of the bay of Bengal, of the coast of Coromandel, and of the island of Ceylon. In the other naval commands, except the South American, climates of such totally different characters are included together as to prevent any accurate comparisons: thus, Western Africa, the Mauritius, and the Cape of Good Hope, form one command, whilst the West Indies and North America comprise another. In South America there are no British troops employed wherewith to form a comparison.

HOME STATION. The ships constituting the home foree have been divided in the Naval Report into two classes: the first, comprising flag and harbour duty ships, surveying vessels, and a few cruisers, is wholly employed on the coasts of Great Britain and Ireland and their respective isles, and its cruising operations extend to the British Channel, the North Sea, St. George's Channel, and the Atlantic Ocean, to the limits of the West Indian, African, and Peninsular commands. The second (designated *various*) includes ships which, "though reckoned on home service, are employed occasionally abroad in various detached duties, ships employed in carrying troops, ships fitting out and paying off, and packets while in England." The sickness and mortality in these, will form a fair subject of comparison with that of the dragoon-guards and dragoons in the United Kingdom. It has been found impossible to arrange the *fatal* diseases in classes, owing to the large proportion of deaths in hospitals and sick quarters, the specific causes of which, as already stated, are not detailed in the Naval Reports; our remarks must, therefore, be chiefly confined to the relative prevalence of disease, as shown in the following tables:

	Naval Force.				Military.	
	"*Various.*"		"*Home.*"		*Dragoon-guards and Dragoons.*	
Ratio per 1000 of strength.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Fevers	60		51		75	
Eruptive Fevers ...	2		6		3	
Diseases of Lungs ...	297		300		148	
" Liver ...	10		10		8	
" Stomach & Bowels	129		106		94	
Epidemic Cholera ...	4		2		4	
Diseases of the Brain ...	16		14		6	
Dropsies	1		1		1	
Rheumatic Affections ...	78		86		50	
Venereal " ...	176		133		181	
Abscesses and Ulcers ...	191		175		133	
Diseases of the Eye ...	15		12		19	
" Skin ...	20		20		29	
Other Diseases ...	78		67		52	
Total, exclusive of Wounds, &c.*	1077	10·5	983	8·8	803	13·7
Ratio per 1000 invalided...	37·1		38·2		26·3	

* The class of wounds and injuries has been omitted, as sailors are, from the nature of their duties, much more liable to them than soldiers.

This table shows the mortality among the military to be rather higher than in the naval force, but perhaps not more so than might be accounted for by the difference in their respective ages, and the excess of invaliding in the latter; the case is otherwise, however, as regards the prevalence of disease which is considerably greater in the navy than the army. This will be found chiefly in diseases of the lungs, of the stomach and bowels, and of the brain, in rheumatic affections, and in abscesses and ulcers. While there is a difference in favour of the navy under the head of fevers, and also, as regards ships employed entirely at home, in venereal affections.

Fevers. The greater prevalence of this class among the soldiers might have been anticipated from their being quartered in large towns, where the causes of fever usually abound, and also from their more frequent opportunities of indulging in habits which are so apt to give rise to the ephemeral type of this disease. This view seems corroborated by its excess in the "Various" over the "Home" branch of the naval force, as the former includes all ships fitting out, on board of which must necessarily be received men who have been for some time previous in the low haunts of the seaport towns, pursuing a mode of life of the most irregular description.

Diseases of the lungs. The most striking difference between the two services is to be found in this class of diseases, and is principally manifested in catarrhal affections, whereof the ratio per 1000 among the dragoon-guards and dragoons has been 122, while in the "Home" division of the navy it amounts to 254, and in the "Various" to 256. This, no doubt, arises from the circumstances already noticed of the more frequent occurrence of night-duty on shipboard, its longer duration, viz. four hours at a time instead of two, the greater exposure of the sailor to the inclemency of the weather, and the sudden chills to which he is liable when turned out of an overheated berth to go on deck in a state of profuse perspiration. Pneumonia and pleuritis are also more prevalent in the navy than army, being in the "Home" division 35, in the "Various" 30, and among the dragoon-guards and dragoons 16. But it is worthy of remark, that while this difference exists in the inflammatory diseases of the lungs, the relative proportion of phthisis and hæmoptysis is to within a fraction the same. Their distribution, however, differs little in the two services, probably owing to the greater facility of discharging from the navy, whereby patients labouring under hæmoptysis are got rid of, who, if longer retained, would in all probability have become phthisical. The ratio of admissions by these diseases conjointly has been among the military $8\frac{3}{10}$, in the "Home" division $8\frac{1}{10}$, and in the "Various" 8 per thousand. The mortality, however, is not in half so large a proportion in the navy as the army, arising, no doubt, from the opportunities sailors have of quitting the service when they feel themselves unequal to their duty. The eagerness which individuals display to revisit their native place in the hope of regaining health, when, in the early stages of consumption, they feel their strength gradually failing and an unwonted languor affecting them, is well known; and, taken in conjunction with the facility with which sailors can obtain their discharge, may we think quite account for the discrepancy noticed by Dr. Wilson between the cases of phthisis and the resulting mortality, without calling in question the accuracy of diagnosis of the naval medical officers.

Diseases of the stomach and bowels. The prevalence of diseases of this class is nearly the same among the military and in the "Home" division of the naval force, but their distribution is somewhat different. Thus diarrhœa and cholera (not epidemic) were more prevalent among the soldiers, while colic, dyspepsia, and constipation, were much more frequent among the sailors. This doubtless has arisen from the nature of their respective diets, the free use of vegetables, on the one hand, with the necessity for subsisting to a considerable extent on salt provisions, on the other, being very likely to produce these opposite effects. The military suffered less than the naval force from inflammatory affections of the bowels, but the total amount of these was so trifling as scarcely to affect the general results. A considerable number of cases of dysentery appear in the returns of the "Various" force, and are understood to have occurred in ships being paid off after their return from tropical stations.

Diseases of the brain. In this class the difference is chiefly in the greater number of cases of headach and vertigo, in the navy; epilepsy is also more frequent, but we are unable to state from what cause. The other diseases of this class are much the same in both services. Delirium tremens is of rare occurrence, the ratio among the military amounting to 6 per 10,000 of the strength, in the "Home" division of the navy to 7, and in the "Various" to 10 per 10,000; but the mortality in the last has been lowest, one death only having taken place among about 16,000 men, while in the "Home" it was in the proportion of one in 7000, and among the dragoon-guards and dragoons of one in 11,000 of the mean strength respectively. This very low ratio among men whose habits are reputed, and we fear with too much truth, to be very dissipated, affords an additional testimony to the accuracy of our opinion that too great stress has been laid, particularly by some army-surgeons, on intoxication as the chief cause of the high rate of mortality among soldiers.

The excess of the *rheumatic*, as of the *catarrhal affections*, seems to depend on the difference of the duties and exposure to wet and cold in the two services, while the exemption from venereal probably arises from the sailor having fewer opportunities of contracting it.

The only other class of diseases in which a marked difference exists, is that of *abscesses* and *ulcers*, arising from the larger number of cases of slight superficial inflammations of the extremities generally terminating in abscess. Dr. Wilson attributes them in a great measure to the sailors' duties, especially cleaning the decks by washing and stoning. The inflammation is generally confined to the lower extremities and seldom extends above the knee. It seems also not unlikely that this peculiarity may in part depend on the stimulating qualities of the salt water with which their feet and legs are so constantly wet.

While the admissions into hospital in the army from wounds and injuries are about 10 per cent. lower than in the navy, the mortality by this class is nearly the same in the two services, the relative proportion of deaths to cases being increased by the greater number of suicides among the soldiers, a crime, we are happy to observe, scarcely known in the navy. It is true that some of the deaths entered as accidents in the naval returns may have been cases of self-destruction, by the sailor voluntarily throwing himself overboard, but there seems no reason to

doubt that they are of much less frequent occurrence than in the army. Sailors are generally a more cheerful race, and frequent change of scene tends to dissipate ennui.

MEDITERRANEAN COMMAND. In the army this comprises the troops at Gibraltar, Malta, and the Ionian islands; while in the navy the ships employed on the coasts of Spain and Portugal, as well as in the Mediterranean, are included; the principal naval station, however, is Malta. Although the services of the naval force are not wholly confined to the Mediterranean, yet as the greater part is employed there, and as the climate of the Spanish coast is very similar to that of Gibraltar, a fair comparison may be drawn of the relative health of soldiers and sailors when exposed to the same climatorial agencies.

The following table shows the ratio of admissions and deaths among every thousand men, on the average of seven years (1830-36), from the principal classes of diseases, exclusive of those by wounds and injuries.

	NAVAL FORCE.		MILITARY.	
	Ratio per 1000.		*Ratio per* 1000.	
	Admitted.	Died.	Admitted.	Died.
Fevers	84	1·7	211	3·7
Eruptive Fevers	4*	2	1	·05
Diseases of Lungs	251	3·3	144	6·5
" Liver	10	·3	16	·6
" Stomach and Bowels ...	158	1·1	188	2·5
Epidemic Cholera	2	·4	7	2·1
Diseases of Brain	18	·9	11	1·1
Dropsies	1	·2	2	·4
Rheumatic Affections	65	1·1	44	1·05
Venereal "	100		107	
Abscesses and Ulcers	283		122	
Diseases of Eyes	13		65	
" Skin	17		14	
Other Diseases	71		58	
Total, exclusive of Wounds and Injuries ...	1077	9·2	980	18
Ratio per 1000 invalided	25·7/10		9·4/10	

This table shows the amount of sickness in the navy to be one tenth higher than in the army in this command, while the mortality from disease among the soldiers is nearly double that of the sailors.

We shall briefly examine in what classes this remarkable difference is principally to be found.

Fevers. A large proportion of the cases being of endemic origin, it is not surprising that the troops should suffer in a much higher ratio than the sailors, for while the former remain for a considerable period in the

* In this calculation we have omitted 203 cases of vaccination, as it can scarcely be deemed a disease. All soldiers who do not bear distinct marks being vaccinated immediately on enlistment, cowpox is almost never met with in the military returns from foreign stations: such, however, does not seem to be the practice in the navy; and it would therefore be unfair to include these cases in a comparison of the diseases affecting the two services.

same place exposed to the cause of the disease, the latter are not only frequently changing their station, but generally lie at some distance from the shore, beyond the influence of noxious miasmata. Moreover, a large proportion of the military are stationed in the Ionian islands, where the causes of intermittent and remittent abound, while comparatively few ships are employed there. The influence of this circumstance may be estimated by the fact, that the ratio of fevers among the troops in these islands, amounting to about 2-5ths of the whole force in the Mediterranean, during the seven years under review has been 334, while among those at Gibraltar and Malta, it has only been 133 per 1000.

The intensity of these diseases has been very similar in both services, one death having occurred in 56 cases among the sailors, and one in 57 among the soldiers.

Eruptive fevers. Of this class, smallpox and measles have been more prevalent in the naval than the military force, the others have existed to nearly the same extent in both services. In the period under review, 141 cases of smallpox occurred in the navy and only 12 in the army; of the latter, 10 occurred at Malta in 1830, when the disease was epidemic on the island. It prevailed in the navy at Malta in 1830, and at the Tagus in 1833-4, and 6. These reports bear important testimony to the protective value of vaccination, for while at Malta 1169 of the civil population were cut off by the epidemic of 1830-1, only 10 cases and two deaths occurred among the soldiers, and 38 cases and one death among the sailors. Its modifying influence is also evinced, for only 6 per cent. of the cases proved fatal, being somewhat lower than the results of Dr. Gregory's observations on cases protected by vaccination which were admitted into the Smallpox hospital in London. (Med. Chir. Trans., vols. xxii and xxiv.) The cases of measles were three times as numerous in the navy as in the army, attributable to the larger proportion of boys employed, and to the greater difficulty of preventing its extension on shipboard by an effectual separation of the sick.

Diseases of the lungs. The admissions by this class in the Mediterranean have, as on the Home station, been twice as numerous in the naval as the military force, from the greater prevalence of catarrhal affections. This, as we have already remarked, probably arises from the nature of their respective duties. The admissions by other diseases of the lungs have been nearly the same in both services except by consumption, of which the proportion among the sailors has been 50 per 10,000, and among the soldiers 67, a difference for which we are unable to assign any satisfactory reason, except the greater facility in the navy of getting rid of subjects who manifest a tendency to this disease. The results, however, corroborate the remarks in the Military Report, that residence in the Mediterranean does not seem to retard the development of consumption in persons constitutionally predisposed to it, for the proportion attacked of the naval force is quite as high as among the civil population at home, and even higher than among sailors on the Home station.

The proportion of deaths by this class of diseases is only one half as high among the naval as the military force, a result which might naturally be expected, from the greater facilities for invaliding, and the more

frequent opportunities of sending men home while the disease is in a condition to be benefited by change of climate. The advantages arising from this change have long been admitted in cases of consumption, and in the Naval Report we find it stated that, "though the fact is opposed to many preconceived opinions, it is ascertained that bronchitis, which originates in the Mediterranean, and which often runs rapidly to a fatal termination there, may be arrested by moving the subject to England." That the results in the navy are materially influenced by the facility of invaliding, is corroborated by the fact, that while one half of the cases of hæmoptysis and phthisis among the soldiers terminated fatally, only one fourth of the sailors attacked by them are reported to have died.

Diseases of the liver are much more prevalent and twice as fatal among the soldiers as the sailors, but in neither service are they a source of much inefficiency.

Diseases of the stomach and bowels. On the Home station we found this class to be rather more prevalent in the navy than the army, but in the Mediterranean command the reverse is the case, in the proportion of 188 to 158. This excess among the military arises entirely, however, from the greater prevalence of these diseases at Gibraltar for while the ratio in that garrison has, during the seven years under observation, amounted to 238 per 1000, it has throughout the other stations in the command only averaged 160, or almost the same as the navy. This most probably is in consequence of the difference in the diet of the soldier, whose ration at Gibraltar during the period under review, consisted of salt beef or pork four times a week in winter, and twice a week in summer; vegetables also were often too expensive for him to obtain, consequently he had the same disadvantages in this respect as the sailor, without the corresponding variety in the other articles of food. In the Mediterranean the sailor, on the contrary, being much in harbour or along shore, is amply supplied with fresh meat and vegetables.

If we compare the relative prevalence of the particular diseases of this class in the navy and army (exclusive of the troops at Gibraltar, which, for the reasons above stated, may be regarded as an exception,) we find that among the latter dysentery is more than twice as prevalent; that colic, with diarrhœa and cholera, occur in nearly the same proportion in both services, while sailors suffer twice as much from dyspepsia and constipation, and are likewise more subject to inflammation. The mortality by diseases of the stomach and bowels has been scarcely half as high in the naval as in the military force, which might have been anticipated, as there are no diseases in which change of air exerts so favorable an influence as in chronic affections of the bowels. Independent of the frequent removal of the sailor from one part of the command to another, constant opportunities are afforded of sending him to England when deemed necessary, while soldiers are often kept at Malta for some months without the means of transport, however urgent their cases may be. As a consequence of this it may be stated, that 15 soldiers only were discharged for diseases of the liver and bowels out of a strength of 62,300, while 55 sailors were invalided for the same affections, out of a strength of 55,709. Had the former enjoyed the same advantages, there seems good reason to believe the resulting mortality would have been proportionately reduced.

Epidemic cholera. This disease was much less prevalent and fatal in the navy than among the troops, although of the latter only those at Gibraltar suffered from it. In 1833 there occurred 57 cases and 17 deaths among the ships in the Tagus, the disease at the same time being very prevalent and fatal in Lisbon. In 1834 it again broke out in the naval force, when 39 cases and 9 deaths took place; of these, 4 cases, two of which proved fatal, were on board the Jaseur, off Gibraltar, the remainder were in the Ringdove and Castor, off Santander where the disease then existed. As soon as the Castor put to sea the cholera ceased on board, and probably to the opportunities of quitting the spot where it originated, may be attributed the exemption enjoyed by the navy from this epidemic, and also the minor intensity with which it prevailed, as similar beneficial results have been found to follow the removal of troops, even to a short distance, whenever that measure has been practicable on shore.

Diseases of the brain have been considerably more numerous in the navy, chiefly owing to the large number of cases of headach and vertigo. Exclusive of these the general ratio very nearly corresponds, but the distribution of the several diseases varies in each service; thus in the navy, inflammation of the brain, apoplexy, and epilepsy, have been more prevalent, while in the army the excess has been in cases of paralysis, amentia, mania, and delirium tremens, particularly the last two. There have been 14 cases of coup-de-soleil in the navy, but none among the military. The exemption from mania and delirium tremens probably arises from the sailor having fewer opportunities of habitual indulgence in intoxication, for while his ship is at sea he cannot procure more than the regulated allowance of wine or spirits, and even in harbour can only indulge to excess when he has leave on shore; whereas, the soldier, even when confined to his barrack, has the canteen open to him so long as he has money in his pocket to purchase the means of intoxication.

The mortality by this class of diseases closely approximates in the two services; in the navy more than half of the deaths have been recorded as caused by apoplexy, while very nearly half of those among the military appear under the head of delirium tremens. It seems very extraordinary, that out of 56 cases of amentia and mania among the seamen not one should prove fatal; half of them, however, were invalided.

Dropsies are so often the sequel of fevers that their greater prevalence among the military might have been anticipated. Twice as many cases occurred among the troops in the Ionian islands as at the other stations, a result which accords with the higher ratio of fevers there, as already noticed in our remarks on that head.

The nature of the duties being the same here as on the Home station, it was natural to expect a similar excess of *rheumatic affections* among the sailors, provided they were influenced, as we supposed them to be, by this circumstance; and accordingly we find that the ratio has been one half higher than among the military.

There is not the same difference in the prevalence of *venereal diseases* which was found to exist between the military and the "home" division of the naval force, the proportion being nearly the same in both services. This most probably arises from strict regulations being enforced by the

police for the exclusion from Gibraltar of all females likely to communicate venereal, and for their detection and subsequent treatment in a Lock hospital in Malta and the Ionian islands. Owing to these precautions this class of diseases is little more than half as prevalent among the soldiers in the Mediterranean as at home.

Abscesses and ulcers have been still more numerous among the sailors in this command than on the Home station, depending on the same cause, the prevalence of superficial inflammations of the extremities terminating in small abscesses.

Erysipelas. This is included under the head of "Other Diseases." We find it to have been four times as prevalent and fatal in the navy as among the soldiers. Although it does not now rage to the same extent as formerly in the navy, it still appears occasionally as an epidemic in particular ships; for instance, 49 cases occurred on board the Windsor Castle in 1830, and 76 in the Prince Regent in 1831; of the latter, 50 were admitted while the vessel was on the Home station and 26 in the Mediterranean; in neither did the disease prevail to a greater extent the following year than among the rest of the fleet. Sometimes, however, the tendency to erysipelas is so great that it appears after the slightest scratch or contusion, and this predisposition manifests itself on board the same ship for a series of years. The Caledonia (120) afforded a striking illustration of this: in 1831, 18 cases occurred in her while forming part of the home force; in 1832, 5 were admitted previous to and 22 after her arrival in the Mediterranean; in 1833 there were only 3 cases, but in 1834 there were 27; in the following year, 30, and in 1836, 34 cases. The same fact is developed, but not quite so forcibly, in the instances of the Donegal (78) and the Edinburgh (74). The cause of this peculiarity has never been explained, nor can any reason be assigned why this disease should prevail in one ship and not affect another close to her, and apparently in every respect similarly situated. The ratio of erysipelas has been higher in the Mediterranean than in any of the other naval commands.

During the period under review, 172 cases of *palpitation of the heart* have been treated in the navy, while only four appear in the military returns. This might, to a certain extent, be owing to the number of growing lads employed in the former, but the difference appears too great to be thus accounted for, nor can we offer any satisfactory solution. The cases of *carditis* and *pericarditis* have been more numerous in the navy, in the proportion of 14 to 10, which may, we think, be explained by reference to the relative numbers of rheumatic affections. *Hernia* has been three times as common among the sailors as the soldiers, induced most probably by the nature of their duty, and also by the severe falls which they often receive.

We have as yet compared the health of the army and navy in temperate regions only, we shall now consider the relative influence of a tropical climate on them.

The East India command. This naval command extends from the tropic of Cancer to the 45th degree of south latitude, and from the 50th to the 150th of east longitude, the northern limit being the isthmus of Suez, the southern the island of Tasmania. It includes all that part of the coast of Asia bounded by the Indian Ocean, the islands in that ocean,

the British possessions of New Holland and Tasmania, and the islands in the North Pacific. The operations of the squadron, however, are chiefly directed to the shores of the bay of Bengal, of the coast of Coromandel, and of the island of Ceylon. Australia has generally one or more vessels on its coasts; occasionally some force has been required before Canton, and cruisers have been employed for the suppression of piracy, principally among the eastern islands. Although, therefore, the service is chiefly intertropical, from the great extent of the command and the variety of the services required, the navy enjoys great advantages in the frequent change from one station to another, with an occasional run to the healthy shores of New Holland. The only portion of the British military force in the East whereof the details have been published, with which the health of this portion of the navy can be compared, is that of the European troops in Ceylon. The following table shows the ratio per 1000 of admissions and deaths, except those caused by wounds and injuries, in each of the forces respectively during a period of seven years.

	Naval Force.		European Troops in Ceylon.	
	Ratio per 1000.		*Ratio per* 1000.	
	Admitted.	Died.	Admitted.	Died.
Fevers ... ... Eruptive Fevers	178	3·1	319	5·6
Diseases of the Lungs	193	1·8	79	5·6
„ Liver	29	1·5	50	5·
„ Stomach and Bowels ...	266	4·6	323	19·4
Epidemic Cholera	17	2·4	24	7·3
Diseases of the Brain	41	·8	7	1·4
Dropsies	1	·9	5	1·9
Rheumatic Affections	67		37	
Venereal „	86		69	
Abscesses and Ulcers	274		166	
Diseases of the Eye	15		75	
„ Skin	5		6	
Other Diseases	53		53	
Total, exclusive of Wounds and Injuries ...	1225	15·1	1213	46·2
Ratio per 1000 invalided	33·6		3·6	

The same feature may be observed in this as in the former tables, viz. the greater amount of sickness and the lower rate of mortality in the navy, but it is by no means so marked in regard to the admissions as the deaths. The latter may in some measure be accounted for by the greater influence of age on mortality in tropical than temperate climates, by the higher proportion of invaliding, and by the effect of length of residence on various diseases. If the opinion we have already expressed as to the average age of sailors being considerably under that of the military be correct, there can be no doubt that this must tend very materially to reduce the mortality, as the ratio increases with age much more rapidly in tropical than in temperate climates. For instance, in Ceylon, while the deaths from all causes among soldiers under the age of 25 amounted to 24 per 1000; between 25 and 33, it was 55; between 33 and 40, it was 86; and between 40 and 50 was 127 per

1000 of the strength. Again, the amount of invaliding from the East India command is more than nine times as high in the navy as in the army. This seems to arise, not from any difference in the necessity for invaliding, but from the expense of that remedy operating as a bar to its being more generally adopted in the army. A sailor whose health has become impaired by the climate may be transferred to the first of Her Majesty's ships returning to England and there discharged, unless his health is restored by the voyage at this early stage of his disease; while the soldier is detained till some troop-ship or transport is proceeding home, and as many months may elapse before such an opportunity presents itself, he frequently sinks under the disease in the meantime, or his constitution is so much shattered that he does not live to reach his native land.

We understand that since the publication of these Reports instructions have been issued to the naval commanders on foreign stations to afford every facility for the conveyance home, in ships of war, of invalid soldiers recommended by a medical board for change of climate. This was not the case, however, during the period under review, and the difference in the facility of getting rid of men whose constitutions had suffered from the climate, must have had a material influence on the relative amount of mortality. We shall now briefly notice a few of the more important diseases comprised in the preceding table.

Fevers. This class of diseases, as at all the other stations we have compared, was much more prevalent and fatal among the soldiers than among the sailors. It is remarkable, however, that the proportion of deaths to admissions is almost exactly the same in both, being 1 in 59 of the sailors, and 1 in 58 of the soldiers. From this we would infer that the higher ratio among the latter does not arise from the admission of a larger number of slight cases, but from the men being exposed in a greater degree to the exciting causes of fever.

The cases of eruptive fevers have been so few that we have included them in the calculation with other fevers; only 7 cases and 2 deaths occurred in the navy, and 13 cases and 2 deaths among the military, in the course of seven years.

Diseases of the lungs. While the actual prevalence of catarrhal affections is considerably less both in the army and navy than either at home or in the Mediterranean, the *relative* proportion in the latter service is increased, being three times as high as among the soldiers. The deaths, however, have been more numerous among the latter, probably from the greater difficulty of sending home invalids. Pneumonia and pleuritis have also been more frequent though rather less fatal among the sailors than among the soldiers. But the exemption enjoyed by them from hæmoptysis and phthisis is even more marked than in the Mediterranean, the proportion attacked being little above one half of what occurs among the military, or if we take phthisis alone it is as 30 to 53. It seems evident then that sailors are considerably less subject to phthisis than soldiers; this may be in part accounted for by the greater prevalence among the latter of fevers, which undoubtedly tend to develop phthisis in persons predisposed to it; while the circumstances already adverted to as likely to maintain the general health of the sailor, such as

better diet, exercise, the influence of the sea air, the frequent change from one part of the command to another, may also contribute materially to avert this disease. The proportion of deaths to cases is higher than in the Mediterranean command or on the Home station, probably owing to the greater distance from England, as many of those who die on the passage home might arrive in a fit state to be discharged if the voyage was shorter.

Diseases of the liver have been one third more prevalent and three times as fatal in the army as in the navy. We shall immediately advert to the cause of the greater intensity of diseases of this class in the army.

Diseases of the stomach and bowels. These have been more prevalent and four times as fatal among the soldiers as among the sailors. Gastritis and enteritis have prevailed to nearly the same extent in both services; dysentery has been three times as common, and the cases of colic a little more numerous than among the sailors, while the ratios of all the other diseases of the bowels have been higher in the navy, but more especially dyspepsia and constipation. In connexion with the subject of dysentery, we find a circumstance noticed in the Military Report which illustrates the importance of frequent and minute inquiries into the condition of the soldiers in our colonies.

"Prior to 1832 the European soldier (in Ceylon) had no bedding, unless a wooden cot or stretcher with a thin coverlid of country cloth termed a cumley could be deemed such; consequently he either lay down at night in clothes which had been saturated with perspiration during the day, or if he undressed, the thin coverlid afforded little or no protection against the rapid diminution of temperature often experienced in that climate during the night. This being supposed in some instances to give rise to dysenteric affections, a mattress filled with the dried husk of the cocoa nut, and blankets have since been issued to him, which have added very materially to his comfort, and it may be presumed also to his health." (Ceylon Report, p. 7.)

The correctness of this inference is supported by the diminished prevalence of diseases of the stomach and bowels since that period, as shown in the following statement:

	1830	1831	1832	1833	1834	1835	1836
Ratio of admissions per 1000 by this class of diseases	370	373	361	301	281	242	329
	368			290			

Thus it appears that after this change in the condition of the soldier a marked reduction took place, and principally among the cases of dysentery. In 1836 there was an increase in the number of admissions as compared with the three preceding years, which, however, was entirely attributable to the greater prevalence of diarrhœa, and apparently of a mild character; dysentery still continued to decrease, indeed there were fewer cases in that than in any previous year.

The mortality has been higher in the army by all the diseases of this class, but the most striking difference is in that from dysentery, which has been nearly five times as high as in the navy. This may have arisen in some measure from the much larger number of sailors invalided for

this cause. In no cases does change of air prove more beneficial than in chronic diseases of the liver and bowels, and we find that while only two soldiers have been discharged for these during the seven years under review, 95 sailors have been invalided out of a smaller force. This must of course materially influence the results, and in addition, the opportunity of sending sailors on an occasional cruise, to the coast of New Holland for instance, when convalescent from dysentery, cannot fail to be productive of the best effects. The shorter duration of the sailor's service, too, tells strongly in his favour, for individuals who have once suffered from dysentery are extremely subject to its recurrence, consequently during the ten years a regiment is stationed in Ceylon, some of the men are repeatedly treated for it, each attack renders them more liable to and less able to resist the succeeding, until at length they sink under it, whereas the sailor being seldom employed more than four years in the command, has a much better chance of returning to a temperate climate before irremediable disease of the bowels sets in.

As in the Mediterranean command, *epidemic cholera* was less prevalent and fatal in the navy, and the proportion of deaths to admissions was only about half what occurred among the military. During the period under review it prevailed in an epidemic form in 1832 among the troops in Ceylon, and cut off a twentieth part of the force. An interesting history of the progress of the epidemic on this and two previous occasions is given by Major Tulloch, but the cause of the disease still remains involved in mystery. Although the military at Trincomalee suffered very severely in 1832, only 9 cases and 3 deaths occurred among Her Majesty's ships in the harbour there; indeed throughout the East India command only 24 cases and 4 deaths occurred in the fleet in that year. The greatest number of cases in the navy in this command occurred in 1833, when 123 were admitted, and 16 died; of these, 98 cases and 8 deaths were on board the Undaunted, which had been a fortnight in the Madras roads refitting when the disease appeared. After raging eleven days, the epidemic ceased, the vessel having in the meantime sailed from Madras; no cause could be assigned for its outbreak on this occasion.

Diseases of the brain. The difference in the relative amount of these is much greater than in any of the commands yet investigated, but arises chiefly from the number of cases of headach and vertigo. We do not know to what this is attributable, but it is remarkable that while in the navy 384 cases have been recorded under these heads, only 7 appear to have occurred among the military. Regarding the other diseases of this class, apoplexy and paralysis have been equally prevalent in both services; delirium tremens and mania have been more common in the army, while amentia and epilepsy, but particularly the latter, have prevailed to a considerably greater extent in the navy. The mortality by this class has been greater among the soldiers than among the sailors, but the ratio invalided of the latter has been eight times as high as of the former. It is worthy of remark that in a country where spirits can be purchased at a very low price, and where in addition the men are liable to be exposed to the intense heat of a tropical sun, the proportion of delirium tremens has only amounted to 14 cases in every 10,000 soldiers, and 8 in the same number of sailors.

Dropsies have been much more prevalent and fatal among the military. In this class are included 9 cases and 3 deaths of *beri beri*, of which disease none occurred among the sailors.

Rheumatic affections are rather less prevalent among the military than in the Mediterranean, but the ratio among the sailors is almost exactly the same as in that command.

The ratio of *venereal affections* is lower among the soldiers than the sailors, the difference being principally in the cases of syphilis. No sanatory regulations are enforced in Ceylon, to which this difference can be attributed.

Although the troops suffer to a great extent from *abscesses* and *ulcers* they will be found to enjoy the same exemption which has already been shown to exist both at home and in the Mediterranean, as compared with the navy. The difference consisted as in the other commands, in the cases of superficial inflammation terminating in abscesses; ulcers were considerably more numerous among the soldiers, being frequently produced by the bite of the hirudo geometra.

Diseases of the eyes have been a source of much greater inefficiency in the army than in the navy; this does not appear to have arisen from any sudden outbreak of ophthalmia, but to be a constant result in every year of the period under consideration. This diversity has not been found to prevail on the home station.

There has not been the same difference in the number of cases of *carditis* and *pericarditis* which was observed in the Mediterranean, but 25 admissions from palpitation of the heart are recorded in the naval report, while none appear to have occurred among the military.

With regard to *wounds* and *injuries* we find the same feature to prevail in the Mediterranean and East Indies as at home, that while the inefficiency is much greater in the naval force, the mortality by this class (including accidental and sudden deaths,) is higher among the military. Thus in the Mediterranean the ratio of admissions in the latter was 108 and in the former 123, whereas the deaths were $2\frac{4}{10}$ and $1\frac{8}{10}$ respectively. In the East India command the admissions among the sailors were 195 per 1000, and the deaths $2\frac{2}{10}$, while among the soldiers the cases amounted to 143, and the mortality to $3\frac{6}{10}$ per 1000 of the strength.

We must now conclude our remarks on this very interesting subject, and in doing so may be permitted to express our satisfaction that the volumes under review have not been thrown aside, as a large proportion of the "Blue Books" are, without producing any practical result. In accordance with the suggestions contained in these reports, several measures tending materially to ameliorate the condition of the soldier have been adopted. Of these we may instance the improvement of his rations at Gibraltar and in the West Indies, by the diminution of the amount of salt meat issued; the selection of more healthy sites for barracks in Jamaica, and particularly the removal of great part of the European force to the upland stations of Maroon Town and Newcastle; the rotation system of relief, whereby the period of continuous service in the West Indies has been reduced from ten to three or four years; and, lastly, the recent order authorizing a passage to be granted in ships of war to soldiers invalided on foreign stations. It is gratifying to know that although these measures at first met with considerable opposition, they

have proved most successful in their results. There yet remains abundant room for improvement, but we trust the executive will persevere in the good work thus begun, and endeavour by judicious measures to raise to the highest standard the health of our army, bearing in mind the opinion of the greatest military authority of the age, that in military operations "as nothing is so useful as a healthy soldier, and nothing so useless, expensive, and burthensome, as one in hospital, any measure which can be adopted to improve the health, is one of the greatest public utility, and wise economy."*

Art. III.

Cataract, and its Treatment, comprising an easy mode of dividing the Cornea for its extraction, and appropriate means for removing the different forms of that Affection. By John Scott, Senior Surgeon to the Royal London Ophthalmic Hospital, &c.—*London*, 1843. 8vo, pp. 72.

Almost the only original part of this pamphlet is contained in the two or three pages preceding and following the woodcuts by which it is accompanied. The rest, with very little exception, is made up of such remarks on the symptoms, varieties, diagnosis, causes, prognosis, and treatment of cataract, as are to be found in all the common treatises on disorders of the eye; and our wonder is, that a gentleman of Mr. Scott's standing in the profession should stoop thus "to twist the same rope again." As, however, some of the subjects discussed in Mr. Scott's production are of the greatest importance in a practical point of view, we shall give to its contents a fuller consideration than either its size or its intrinsic merits would otherwise demand.

The following are a few particulars which deserve notice in the early part of the work.

Mr. Scott bears testimony (p. 2) to the existence of what has been called *black cataract*. "I have removed," says he, "a cataract nearly as dark as pitch, and it was of very firm consistence."

Speaking of soft cataract, (p. 10,) he tells us, that it "occurs at an earlier period of life than hard cataract," and that "the margin of the lens is usually more opaque, so that vision is more obscured even in a dilated state of the pupil." The latter statement affords a specimen of a style of writing, ambiguous from carelessness, which occurs pretty frequently in Mr. Scott's pamphlet. Does he mean, that in soft cataract vision is more obscure, even with a dilated pupil, than it is in hard cataract; or that vision is more obscure, even in a dilated state of the pupil, than in a contracted state? As to soft cataract occurring at an earlier period of life than hard cataract, it might have been well to have stated the cause, viz. the difference in the natural consistence of the lens in young and in old people.

At page 18, Mr. Scott says, "In the early stage of cataract, I am aware that the lens still retains its natural consistence, and that the operation by solution will then effect its removal," a remark which might lead the reader to suppose that the duration of a cataract, independently of

* Gurwood's Despatches of the Duke of Wellington.

the advances of age, had a tendency to harden the lens, and that the operation of division was an advisable one, even in old people, if the opacity had only recently made its appearance, neither of which suppositions would be agreeable to fact.

Mr. Scott does not think it desirable to operate on both eyes at the same time, for the following very satisfactory reasons, which we have not seen insisted on so closely and forcibly by any other author:

"Should there," says he, "be any unhealthy state of system causing inflammation to succeed the operation, it will equally influence both eyes, and vision may be irrecoverably lost; or if, from accidental local circumstances, inflammation be set up in one eye, the second may very probably be sympathetically affected; whereas, if one only be operated on, and any unfavorable result should occur, we may hope to operate on the other under more favorable circumstances, and with good prospect of success." (p. 19.)

At page 25, Mr. Scott tells us, that the pupillary margin of the iris is more liable to be divided by the knife in the dilated than in the contracted state; an opinion contrary, we believe, to what is generally held. But granting Mr. Scott's statement to be correct, it seems to us to militate against the advice previously given, (p. 22,) that, in cases of smallness of the anterior chamber, the pupil should be fully dilated, so as *to obtain room to pass the knife without wounding the iris.*

Mr. Scott does not appear sufficiently guarded in two statements which he makes regarding the escape of the aqueous humour, in the operation of division through the cornea; for at page 22 his words are, "This operation by solution, however, being also generally attended with the escape of the aqueous humour," whereas at page 35 he says, "The introduction of a needle into the anterior chamber can always be effected without the slightest difficulty, and it can generally be retained there for a sufficient length of time to break up the texture of the lens without the escape of the aqueous humour." To this criticism, it might perhaps be objected that, at page 22, our author refers only to cases of small anterior chamber, but at page 35, to eyes of normal conformation. We doubt, however, if even this explanation can acquit him of contradiction; for it is not upon the amplitude of the anterior chamber, but on the form of the needle, and the method of handling it, that the confinement of the aqueous humour depends.

The recumbent position is recommended (p. 26) for the operation of extraction, as one which not only obviates most effectually any unsteadiness on the part of the patient, but allows the surgeon to rest his hand in an easy and convenient manner, and thus enables him to perform the section with precision. Mr. Scott subjoins another reason, of which we are not so sure. "It presents," says he, "the escape of the vitreous humour to any deleterious extent, for it cannot gravitate out of the eye in this position." We have certainly seen the vitreous humour fly from the eye as frequently when the patient was lying as sitting, and think it pretty certain that gravitation has nothing to do in the matter.

The following judicious advice refers to the third period of the operation or the exit of the lens:

"In this part of the operation it is necessary to take care that the pressure is confined to the anterior part of the eye, which is to be compressed just behind the margin of the lens, so as to dislodge it from the capsule, and to tilt it forward

through the pupil; if the whole globe of the eye be pressed backwards into the orbit, the escape of the vitreous humour will be endangered, instead of the protrusion of the lens taking place." (p. 30.)

It sometimes happens, that in making the section of the cornea, a small portion of the iris is excised. If this portion does not include the pupillary edge, a circular aperture will be formed in the iris, and the pupil, Mr. Scott informs us, will not dilate readily when the lens is pressed against it. He therefore divides, with Maunoir's scissors, the fibres intervening between such an aperture and the natural pupil, thus allowing the cataract to be extracted. (p. 33.) We do not recollect to have met with this rule in any other author.

For enlarging the section of the cornea, when it happens to be made too small, we agree with Mr. Scott, that Maunoir's scissors is not an appropriate instrument. David's doubly-curved scissors have the advantage of cutting close and parallel to the edge of the cornea, and are greatly superior to the knife recommended (p. 33) by Mr. Scott, for enlarging the incision.

The idea (p. 35) of returning the vitreous humour into the eye, with the curette, is natural enough; but the thing is impracticable.

Mr. Scott recommends a narrow convex-edged knife for making the section of the cornea, very different in shape, therefore, from the knives of Wenzel and Beer, but not very unlike those employed by the Pelliers, the sons of him whose speculum was so long in vogue. The forms of the Pelliers' knives are delineated in fig. 1 of plate viii, and fig. 6 of plate xxiii, of Pellier de Quengsy's 'Cours d'opérations sur la chirurgie des Yeux,' and the reader may compare them at his leisure with Mr. Scott's knife, of which the following figure (fig. 1) shows the shape and dimensions.

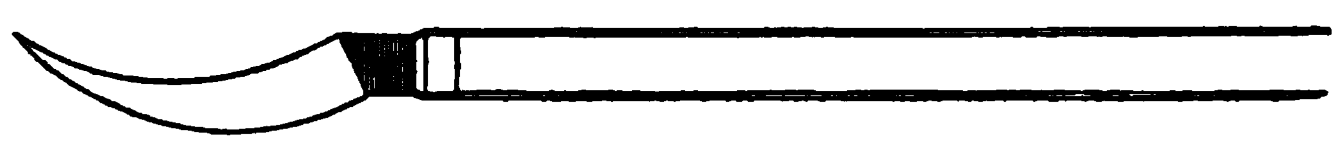


fig. 1.

Mr. Scott is not the first who has felt that there are difficulties and dangers in dividing circularly with a knife a membrane, inclosing a fluid, which is not to be evacuated till the section is carried to the extent of a semicircle, and within which fluid is suspended another and a moveable membrane, which is neither to be allowed to be displaced, nor is in any way to be injured, in the execution of this section. Such titles as 'An Inquiry into the Causes which have most commonly prevented success,' or 'A Practical Inquiry into the Causes of the Frequent Failure,' prefixed to writings by Ware and Adams, are sufficient to show that extraction, even in the hands of oculists of great experience, is far from being an operation, the results of which can be calculated on with certainty. Thousands of eyes have, doubtless, been destroyed in this operation since the days of Ware and Adams; aye, even in spite of "The Certainty and Safety with which the Operation for the Extraction of a Cataract may be performed, by G. J. Guthrie, F.R.S." The difficulties and dangers attendant on extraction are indissolubly connected with the nature of the parts concerned, and the extent and object of the operation; they are often aggravated by the unhealthy condition of other structures in the eye, besides those immediately implicated; and, though there is a wide difference between the workmanship of a steady and dexterous operator, and that of a bungler, too conceited to be taught, and too

little honest to refrain from what he has not brains to comprehend, we are convinced that the dangers and difficulties of extraction never can be set aside, and can, only in a very moderate degree indeed, be obviated by giving to the instrument with which the cornea is to be divided, the very best form which ingenuity and experience are able to suggest.

Mr. Scott is rather of a different opinion. He tells us, in his preface, that he has "long considered that the chief difficulty and the chief danger attending the extraction of cataract has arisen from the force which is necessary to transfix the cornea with the instruments commonly employed for that purpose; and that spasm of the recti muscles, induced by that force compressing the iris between the hard lens and the side of the knife, and occasioning inflammation of that membrane, has been the most frequent cause of an unfavorable result of the operation." It therefore occurred to him, "that if these inconveniences could be obviated," in other words, if a knife could be invented, which should require less force to transfix the cornea than those of Wenzel and Beer, "the facility of performing the operation would be greatly increased, and its success proportionately augmented." With this view, then, Mr. Scott has constructed a knife, and having tested it in a great number of cases, he feels anxious to afford to others an opportunity of employing it.

"The cornea-knives usually employed," says Mr. Scott, "not only increase in thickness and in width from point to heel, to fill up the aperture they make in the cornea, as they traverse the anterior chamber, and thus prevent the escape of the aqueous humour, but their width is also equal to the radius of the cornea, so as to make a section of that size in the membrane; and this is done by thrusting this wedge-shaped instrument through the cornea, the cutting edge of the knife effecting its division by means of the force with which the back of the instrument is pressed against the opposite margin of the wound. This forcible thrusting of a wedge-shaped instrument of such dimensions through the anterior chamber appears to me to be productive of many of the difficulties as well as the dangers that attend the operation. Thus the force employed tends to turn the eye inwards to the nasal canthus of the orbit, whereby the inner side of the cornea is obscured from the view of the operator, he is unable to puncture it close to its sclerotic margin, and consequently the section is too small for the escape of the cataract.

"If this inversion of the eye is prevented by pressure on the nasal side of the globe, the aqueous humour is liable to escape before the knife has traversed the anterior chamber far enough to prevent the iris from being wounded in completing the section; and even if the knife be so far advanced that the iris cannot escape beneath its edge, the pressure necessarily exerted on the globe often induces such violent spasm of the muscles as to endanger the escape of the vitreous humour, and to subject the iris and the internal tunics to so much pressure as to lay the foundation of serious inflammation." (p. 34.)

Mr. Scott appears to have Beer's knife chiefly in view when he states that the common cornea-knives increase in thickness and in width from the point to the handle. This is a property which has generally been regarded as a valuable one, the knife being thereby enabled to fill up the aperture in the cornea as it advances, and thus to prevent the premature escape of the aqueous humour; and accordingly Mr. Scott studies to preserve this property in the knife which he himself has adopted.

The accusation brought against the common knives, that their breadth is equal to the radius of the cornea, is just; but the reason for this breadth is not "to make a section of that size in the membrane," as Mr. Scott expresses it, but to ensure a semicircular section of the cornea, by the

mere progression of the instrument, without pressing or drawing it in the direction of the incision, and still more without sawing with it backwards and forwards, as must be done if the knife is narrow. A section of the size of the radius of the cornea, as Mr. Scott has it, does not express this fact, and probably does not express the meaning Mr. Scott had in view.

Mr. Scott seems to think it an objection to Beer's knife, that the cutting edge effects the section by its back resting against the undivided portion of the cornea, at the two opposite extremities of the incision. Is it not plain that, unless the back of the knife is in contact with that part of the cornea which remains entire, it will be almost impossible for the aqueous humour to be retained? We have no experience of narrow knives, such as Mr. Scott's, but if they execute the section on any other principle than the very one here objected to, we conceive they must expose the eye to great danger, from the premature loss of the aqueous humour.

The edges of Beer's knife being straight, and meeting at a small angle, it is mathematically demonstrable that it will suffer less resistance than a curved-edged instrument, be the curves what they may. Mr. Scott's expressions, then, of "thrusting this wedge-shaped instrument," and "this forcible thrusting," go for nothing. This cornea-sabre will require the employment of more force to make it transfix the cornea, than any straight-edged instrument, unless it be reduced to such a degree of narrowness in the blade, as will incapacitate it for the end of dividing the cornea, semicircularly, at the distance of 1-20th inch from its circumference, by simple progression; and reduce it from a knife to a saw, which is to haggle through the cornea, by being drawn backwards and forwards.

We happen to have known in our day and conversed with some of the most eminent oculists in this and other countries, who were in the habit of using Beer's knife, and we never heard them speak of the necessity of any "forcible thrusting" in the use of that instrument. On the contrary, everything like violence was always declared to be unnecessary and improper. We are therefore led to regard the objections raised by Mr. Scott as too much in the spirit of a special pleading. We can conceive his objections applicable only to those ill-contrived modifications of Beer's knife, by which its edges are made to meet at a greater angle than 15°. Then, indeed, it is plain it will both traverse the cornea less easily, and, from the slowness with which it must move, expose the eye to a premature loss of the aqueous humour.

Mr. Scott seems of opinion that to apply the point of a finger against the nasal side of the eyeball, so as to prevent it from rolling inwards, should be abandoned, as he thinks such pressure causes the aqueous humour to escape, before the knife has traversed the anterior chamber. We are completely of the opposite opinion. We believe a frequent cause of the accident in question is the patient's being allowed to turn his eye suddenly inwards, at the moment of entering the knife. The plan of operating without making any pressure on the eyeball has often been tried,* but for the reason now mentioned, as well as the difficulty of effecting a sufficient incision of the cornea if the eye is allowed to roll inwards, it is now almost universally and very wisely abandoned.

* Ware's Observations on the Cataract, &c., p. 273; London, 1812.

Another accusation brought forward by our author is, that "the pressure necessarily exerted on the globe often induces such violent spasm of the muscles as to endanger the escape of the vitreous humour," to which we have only to reply, that any such violent pressure is perfectly unnecessary for any purpose, and especially for the purpose specified, namely, steadying the eyeball and preventing it from turning into the nasal canthus.

We must repeat our impression, that a great portion of the objections raised by Mr. Scott against such instruments as are in common use at the present day for opening the cornea, are much exaggerated, and, in a great measure, groundless.

In the following passage Mr. Scott goes on to explain what he conceives to be the principle on which his cataract-knife is constructed:

"The introduction of a needle into the anterior chamber can always be effected without the slightest difficulty, and it can generally be retained there for a sufficient length of time to break up the texture of the lens without the escape of the aqueous humour, notwithstanding the repeated movements of it that are necessary for performing this operation. From reflecting on this circumstance, it occurred to me, that if a knife could be constructed that might be introduced into the eye with as little force as is necessary for the introduction of the needle, and could be formed of such a shape as would complete the section of the cornea without danger of wounding the iris, the difficulties and the danger attending the operation would be most materially lessened. Let it be remembered, that in the usual way of operating, the knife cuts its way *into* the cornea, which requires considerable force; whereas, upon the plan I propose, it is introduced into the anterior chamber without any further division of the cornea than is necessary for the purpose of its introduction, the section of the membrane not being commenced until both sides of the cornea have been punctured; and the knife is of such a shape and is then so situated that there is little danger of the iris falling forward before its edge." (p. 35.)

The introduction of a straight needle into the anterior chamber can always be effected without the slightest difficulty, but it is not so with a curved needle. A round-necked needle can generally be retained in the anterior chamber for a sufficient length of time to break up the lens without the escape of the aqueous humour; but it is quite otherwise if the neck of the needle is two-edged. To draw the conclusion, then, from such data, that a curved two-edged knife could be managed like a straight round-necked needle, is a bad specimen of Mr. Scott's logic. He tells us, further, that his plan is to have a knife which shall transfix the cornea before the proper section of the membrane is commenced; but it is sufficient just to glance at the actual breadth of his knife, gradually increasing from the point to the handle, (see fig. 1, above,) and at the figure in his fourth plate, to see that this proposed plan is contradicted in practice. It is quite undeniable that Mr. Scott's knife "is introduced into the anterior chamber without any further division of the cornea than is necessary for the purpose of its introduction;" but it is just as plain that, in transfixing the cornea, it must, from its breadth, divide a considerable portion of that membrane; that it cuts its way *into* the cornea; and that, from its curved form, it must require both more force and more sleight of hand than any straight-edged knife of equal or even of considerably greater breadth.

"The objects I propose to attain," says Mr. Scott, "in the construction of the knife are—

"1st. That it shall be of sufficient length to traverse completely the anterior chamber, and divide the nasal margin of the cornea.

"2d. That it shall increase in width and in thickness from point to heel enough only to prevent the escape of the aqueous humour in its transit across the anterior chamber, but that its width shall have no reference to the dimensions of the section that is to be made, as that circumstance, I conceive, has occasioned all the difficulty of its introduction, and the chief danger of the operation.

"3d. That it shall be of such a shape and figure, that when introduced in the middle of the temporal margin of the cornea and carried across the anterior chamber it shall readily puncture the nasal side of that membrane, and when placed in this situation the cutting edge shall be so far beyond the pupillary margin of the iris, and opposed to so large a portion of its anterior surface as will prevent its escape beneath the edge of the knife to endanger its division in making the section of the cornea.

"4th. That when the section of the cornea is thus about to be made, the edge of the knife shall be opposed only to the margin of the section on either side, and not to any extensive portion of its internal surface, whereby its division would be attended with difficulty, as is the case in using Beer's knife.

"In order to attain these objects, the knife must describe a portion of a circle of larger diameter than that of the cornea." (p. 56.)

"The back of the knife describes a sixth part of the circumference of a circle, the radius of which is ten lines. The cord of the arc formed by the back of the knife is, of course, also ten lines in length, being equal to the radius of that circle; it is therefore greater by four lines than the diameter of the cornea, and the blade is consequently quite long enough to complete the section of that membrane without difficulty. The knife is two lines in width at the heel, whence it gradually tapers to the point; it also increases uniformly in thickness, as well as in width, from point to heel, so as to occupy completely the aperture it makes in the cornea, for the purpose of preventing the escape of the aqueous humour." (p. 37.)

"In making the upper section of the cornea with this knife, it is to be held in the usual manner, between the thumb and two fore-fingers, the two other fingers resting on the patient's cheek, and the handle of the knife slightly inclined towards the side of the face, while the point punctures the cornea on its temporal margin; the handle of the knife is then to be brought upwards with a sweep as the blade traverses the anterior chamber; and when it has punctured the nasal side of the cornea, the angle will be nearly at a right angle with the temple. The knife is then to be carried completely across the anterior chamber: in doing this great care must be taken to press firmly downwards with the back of the instrument, so that the wound may not be unnecessarily enlarged by its cutting edge. This being accomplished, the point of the knife will have reached the nasal canthus of the orbit, and its cutting edge will be so far beyond the pupillary margin of the iris that it cannot be readily divided in completing the section of the cornea. The point of the knife is then to be carried upwards, the handle being slightly inclined in the opposite direction. The section of the cornea on its nasal side will now be complete, a small portion of the upper and outer part only remaining to be divided; and this is readily done in the withdrawing of the instrument." (p. 43.)

Such is Mr. Scott's mode of making the section of the cornea, which, in order that it may be exactly understood, it is necessary to analyse.

Suppose it is the right eye which is to be operated on, the patient lies on his back, the operator sits or stands behind him, holds the knife in his right hand, supports the upper eyelid with the fore and middle fingers of the left hand, takes great care not to permit the inversion of the eye towards the nose by pressure on the nasal side of the globe, and proceeds in the following manner to make the upper section.

First, the point of the knife is to be directed upwards and inwards, and the handle towards the patient's face. This position serves for

making the puncturation. Secondly, the handle is to be brought up with a sweep, and the blade, by this manœuvre, is to traverse the anterior chamber. Thirdly, the counterpuncturation is to be effected, and the handle made to assume a position nearly at a right angle with the temple. Fourthly, the blade of the knife is to be carried across the anterior chamber. Fifthly, the point of the knife is to be directed upwards, and the handle downwards, so as to divide the cornea on its nasal side. Sixthly, in withdrawing the instrument, the upper and temporal portion of this incision is to be finished.

The operation of extraction is universally confessed to be a difficult one, the section of the cornea to be the finest manipulation in the practice of surgery. That the difficulties are to be lessened by the see-saw movements of Mr. Scott's knife, is, we think, extremely improbable. How much more simple, and more likely to answer the purpose intended, viz., a clean cut of the cornea, is the course of Beer's knife, which, from the first puncture to the end of the section, is in the same unvaried direction!

In several parts of his pamphlet Mr. Scott deprecates the employment of pressure. But is it not evident, that in the method described by himself, there must be, at different stages, very considerable pressure exercised? When, for instance, in the second step, he sweeps the handle of the knife up from its inclination towards the patient's face, the temporal side of the cornea must serve as a pivot on which the turn is to be made, and be considerably pressed upon. So much so, that the eyeball, unsupported, as Mr. Scott directs it to be, on the nasal side, must be exceedingly liable to be pushed into the internal canthus. In carrying the knife across the anterior chamber in the fourth step, Mr. Scott, contrary to the dread he formerly expressed (p. 34) of pressing the back of the knife against the undivided part of the cornea, at the two extremities of the incision, tells us, that "great care must be taken to press firmly downwards with the back of the instrument," (p. 43,) and we cannot see that the pressure of his curved knife is likely to be any less detrimental than that of a straight one. If it is the pressure of the knife, in the way mentioned, which excites the violent spasm of the muscles which Mr. Scott describes, the spasm will occur just as readily with the one instrument as the other. The fifth step is altogether one of pressure, and that in a most unfavorable direction, for the nasal portion of the incision is to be accomplished, not by the easy gliding on of the edge of the knife, but by raising its point, lowering its handle, and thus wrenching through the cornea. In every case, but especially in old subjects, in whom the cornea is so often hard and tough, giving rise to a grating sound when it is cut, this part of Mr. Scott's operation must be attended with dragging of the eye, and often fail, we should apprehend, in effecting the division of the cornea, which is intended.

The due retention of the aqueous humour in the eye, so as to avoid the entanglement of the edge of the knife by the iris, depends, as is well known, on the proper form of the knife, which, like a wedge, should accurately increase in breadth and thickness all the way from the point to the handle, and on the steadiness with which it is passed from one side of the cornea to the other, and onwards till it cuts itself out. The appropriate form of instrument, Mr. Scott says, (p. 36,) he retains enough

to prevent the escape of the aqueous humour in its transit across the anterior chamber; but in the fifth step, when he raises the point of the knife, does he not leave a hiatus between the nasal extremity of the incision and the back of the instrument, by which the aqueous humour is almost sure to spring out? As for steadiness, he seems to set it at defiance, and recommends the section to be made, as we have seen, by an actual see-saw, or series of alternate motions of the instrument up and down. Beer's knife is steadied by its back resting at the extremities of the incision on the undivided portion of the cornea. This gives a precision to the motion of its edge, which we consider as of incalculable value. Not so Mr. Scott, who tells us, again and again, that his knife is "an instrument that accomplishes the division of the membrane independently of any such pressure." (p. 43.) The pressure, then, must be on its cutting edge alone, a mode of employing a cataract-knife which we consider as far from being manageable.

The last step of Mr. Scott's incision is accomplished by drawing the knife against the inside of the cornea, and out of the eye; and upon this our author founds the following strange comparison:

"Those who have ever performed the operation of lithotomy with the gorget, and afterwards with the small-beaked knife first used by the late Mr. Blizard, and have contrasted the force necessary to make the section of the prostate gland from without inwards by means of the former instrument, with the facility with which, the latter being introduced into the bladder, the section can be made from within outwards, will readily understand the advantages that attend the mode of operating I now propose, as well as the reasoning that has led to its adoption." (p. 36.)

At this rate, the best mode of cutting the cornea would be to transfix it with a narrow knife, and then, by drawing this out, make the section. The inevitable loss of the aqueous humour, and the violent dragging of the eye, so likely to cause bursting of the vitreous humour, are sufficient objections to any such mode of operating, and must attach themselves, in some degree, to Mr. Scott's operation, of which, although the greater part is performed on the same plan as that with the straight knife, namely, by cutting from without inwards, the termination is by an opposite movement, namely, from within outwards.

The section of the cornea, as every one knows, is divided into the puncturation, the counter-puncturation, and the completion.

As general principles, we can have no hesitation in laying it down, 1st, That the quantity of resistance to the penetration and progress of a knife through the cornea, will increase and diminish, *cæteris paribus*, with the augmented or diminished angle of inclination of its edges; and 2d, That there is no curved figure, convex or concave, assignable to the cutting edge of the knife, by which the friction can be reduced below that of a straight line.

Although the penetration of the cornea will be effected with least resistance by a straight knife, the edges having the smallest possible inclination to one another, it is evident that a very narrow straight instrument is not at all calculated for completing the section; and that for the following reasons:

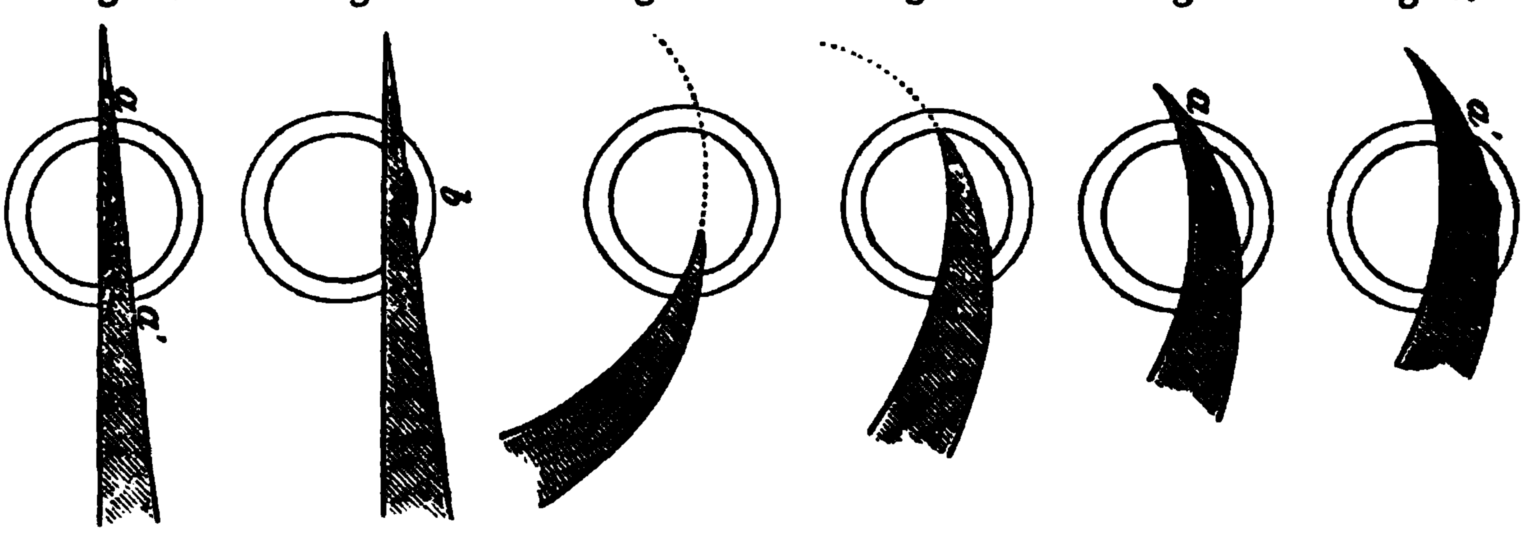
1st. It cannot complete the section, or cut itself out, as the phrase is, without letting out the aqueous humour.

2d. It is much more difficult to continue the section in one plane with a narrow than with a broad instrument.

3d. A narrow instrument must at last be used saw-wise.

4th. A narrow instrument, as the incision proceeds, comes to cut the cornea, not edgewise, but sidewise. Let the space between the two circles, in the six following diagrams, represent the thickness of the cornea.

fig. 2. fig. 3. fig. 4. fig. 5. fig. 6. fig. 7.



At *a* and *b* (fig. 2,) the instrument is cutting through a thin edge, but at *b* (fig. 3,) through a broad surface; and the proportional difference will be greater the thinner the membrane. In fig. 2, the knife is dividing the laminæ of the cornea nearly perpendicularly; in fig. 3, it is acting nearly parallel to the laminæ. One of the great advantages of a broad knife is, that it continues to cut the cornea in some degree edgewise, or perpendicularly to its laminæ, till the incision is completed.

It follows, that a narrow knife is best for penetrating, a broad one best for cutting itself out, or completing the section. Experience alone can decide the form which will combine the two qualities most perfectly. Every one who has extracted knows, that the great resistance is at the completion of the incision, when the motion of the knife is nearly parallel to the laminæ. We believe that the angle of inclination to be given to the edges of the knife, so that it may accomplish the incision with least resistance, and least extent of motion, is about 15°.

As for a narrow curved instrument, cutting by its convex edge, it seems liable to many objections, which do not apply to a straight instrument.

1st. Puncturation offers a great resistance, except it be in the line of the cutting edge of the instrument. In order to puncture the cornea easily with a curved instrument, the motion must be in the direction of the curve, the laminæ must actually be cut in a curve, which causes a greater resistance. Besides, it is far more difficult to follow one precise curve than a straight line. Fig. 4 shows puncturation with a curved knife. To be performed with ease, the instrument must follow the course of the dotted line.

2d. With a curved knife, the difficulty of the counterpuncturation is much increased. The direction of the knife must be shifted, in order to come into contact with the proper point of the cornea, and when that point has been hit, as in fig. 5, the direction of the motion must again be changed, as is shown by the dotted line; otherwise, the point of the knife, attempted to be carried on in a straight line, will meet with an enormous resistance. In short, the resistance, both in puncturation and counter-puncturation, is necessarily greater with a curved than with a

straight instrument, and is increased beyond measure, if the force deviates in direction from the line of the curve.

3d. In carrying the knife across the anterior chamber, it is of great importance to keep its edges always in the same plane, as any bias which they are allowed to take, different from the direction which they had when the counter-puncturation was effected, is apt to allow an escape of the aqueous humour. We are ready to grant, that it is easier to keep a narrow curved instrument in the same plane than a narrow straight one.

4th. The great disadvantage of a curved knife is, that, in completing the section, it comes to act sidewise against the cornea, or, in other words, parallel to the laminæ to be divided, much sooner than the ordinary triangular knife. The retreating of the curved knife from the perpendicular direction, as at *a*, fig. 6, and *b*, fig. 7, is a most serious defect; and the statement of Mr. Scott, that his curved knife is better fitted than Beer's straight knife, to "be opposed only to the margin of the section on either side, and not to any extensive portion of its internal surface," (p. 36,) is manifestly opposed to the plainest mathematical principles, as will be seen by comparing fig. 7 with fig. 3. The great point in a cataract knife is to have the cutting edge as nearly perpendicular to the course of the incision as possible. In such an instrument as Mr. Scott's, the whole contrivance is adapted to make the cutting edge as nearly as possible parallel to the course of the incision, and exactly the reverse of what the inventor says he intended.

Here we must drop the subject of cataract knives, as we doubt not that many of our readers will feel but little interest in matters so minute and technical.

That Mr. Scott can operate with his curved knife, and operate well too, especially when his cutler happens to make it sharp, which, from its shape, can rarely happen, we have no manner of doubt; but, both on theoretical principles, and from practical knowledge, we should advise those who are commencing practise on the eye, to avoid so unphilosophical and dangerous an implement, and keep to the triangular knife of the justly-celebrated Professor Beer, as an instrument better calculated than any other hitherto invented, to enable them to finish the section of the cornea, *tuto, cito, ac jucunde.*

Mr. Scott disapproves of bleeding the patient who is about to submit to extraction, with the view of preventing inflammation. Neither does he bleed after the operation, unless urgent inflammatory symptoms occur, and the patient is robust and able to bear depletion. He advises every precaution to be followed which can tend to bring the patient beforehand into the most favorable condition for the operation, (p. 45,) but omits to say in what such precautions consist.

The most frequent accident after the operation, according to Mr. Scott, is protrusion of the iris through the wound of the cornea. (p. 46.) He ascribes this to spasms of the muscles, excited by any slight blow on the eye, and recommends the protruding membrane to be touched with nitrate of silver.

Of inflammatory affections following extraction, Mr. Scott distinguishes the following varieties:

1. That which rises from under violence in operating, characterized by increased vascularity of the sclerotica, as well as of the conjunctiva, hazi-

ness of the cornea, and dulness of the iris. He says it is attended also by an effusion of *lymph* under the conjunctiva, but we see no reason to believe that the effusion is different in this case from what it is in any other instance of chemosis, that is to say, *serous*. Leeches are chiefly recommended, so as to effect a gradual abatement of the symptoms; warm fomentations; and belladonna. We should deem Mr. Scott's fear, that the too early application of belladonna keeps up the inflammation of the iris, and separates the adhesion too rapidly, perfectly groundless. No mention is made of mercury for this variety.

2. A tedious inflammation, difficult to control, sometimes follows the operation, when the eye has been previously the seat of some inflammatory affection. Moderate depletion is advised, a nutritious diet, and a mild use of mercury. Mr. Scott makes some remarks on the wonderful powers of mercury, admitting the facts, first announced to the profession by Beer,* and now so generally known and acted on, that when there is too much inflammation, this medicine so controls the action of the vessels, as to *prevent the effusion* of lymph into the eye, and that if lymph is already effused, it *promotes its absorption*. He also notices the non-interference of mercury with the healing process, in cases of wounds and ulcers, a doctrine much insisted on by the late Professor Hamilton of Edinburgh.† If this medicine can both stimulate the absorbents to take up lymph, when it is superabundant, and, lulling them asleep when they are too active, as in ulceration, can repair the destruction they have effected, by promoting a healing process, besides controlling the morbid action of the blood-vessels, if used in the earlier stages of inflammation, we shall almost be persuaded into the belief of an *animus medicatrix mercurii*. The truth is, our theory of morbid actions is too imperfect, to enable us to comprehend the effects of mercury; but the fact, that it acts beneficially, in states of disease which seem totally opposed to one another, does not admit of denial.

3. A morbid irritability of system, consequent on want of power in the constitution, produces a form of inflammation, which Mr. Scott describes as coming on two or three days after the operation, especially in old subjects. It is attended with intense pain, of a throbbing aching character, extending deep into the orbit, and affecting the temple, succeeded by great tumefaction of the eyelids, which assume a livid hue, and yellowish-red chemosis of the conjunctiva. The pulse is quick, weak, and small, and the surface of the body pale and cold. The cornea is hazy, and the edges of the wound tumid and of a dirty yellowish colour. Warm fomentations constitute the chief local application. Opium, with ether or ammonia, is to be given internally, to allay the irritability and restlessness. The powers of the system are to be sustained by nutritious diet, cordials, and stimulants.

4. When acute phlegmonous inflammation of the globe occurs, which it does very rarely, it commences within a few hours after the operation, with pain of an acute and throbbing character; the eye is exquisitely sensitive to touch; the pain extends deep into the orbit, and to the side

* Beer's Bibliotheca Ophthalmica, vol. i, p. 55, and vol. ii, p. 85.—Vindobonæ, 1799. Also his Lehre von den Augenkrankheiten, vol. i, p. 449.—Wien, 1813.

† Hamilton's Observations on the Use and Abuse of Mercurial Medicines, p. 219.—Edinburgh, 1819.

of the head, and gradually increases in severity, without intermission or abatement. The eyelids assume a bright red, not a livid hue; they become somewhat swollen, and the surface of the globe prominent from chemosis, but not so rapidly, nor to the same extent as in the third variety of inflammation. If the disease be not checked, enormous tumefaction of the eye supervenes, followed by sloughing of the cornea and suppuration of the ball. A hard, full, throbbing pulse, a hot and dry skin, and the other symptoms of fever are present. By active depletion, an attempt must be made to cut short the inflammation, else the eye will be lost. Free venesection and numerous leeches to the eyelids are chiefly to be depended on. Calomel and saline aperients are to be administered. Abstinence and rest in bed are to be enjoined.

5. In gouty or rheumatic subjects inflammation is apt to continue after the section is healed, and produce closure of the pupil. Mr. Scott ascribes this to too great a reduction of the patient by low diet. He advises cupping on the temple, a blister to the nape, drastic purges, bark, and belladonna. A nutritious but not stimulating diet is to be given, and the patient properly defended from vicissitudes of temperature. The eye is to be kept closed, and all lotions and fomentations avoided. The digestive organs are generally wrong, and may require an alterative course of mercury; but the system is not to be affected, as this increases irritability and aggravates the inflammation.

We give this abstract of Mr. Scott's account of the different varieties of inflammation after extraction, as we deem such distinctions of high practical importance, and deserving of more attention than is generally bestowed on them.

The operation of displacement recommended by Mr. Scott, and called by him depression, but which, he says, is a combination of reclination with depression, (p. 56,) is Willburg's reclination performed with Scarpa's needle.

As the operation is apt to excite inflammation of the internal tunics of the eye, "the patient should be in a condition the least prone to inflammation; consequently," says Mr. Scott, "it is necessary to adopt beforehand all the precautions that were mentioned in speaking of the operation of extraction." But, unfortunately, no particular precautions are mentioned, as far as we have been able to discover.

Dilating the pupil before operating, Mr. Scott regards as of no importance. "I have never found any difficulty," says he, "in operating in the contracted state of the pupil, in which state you lessen the risk of the lens becoming dislocated and wedged in the aperture." (p. 54.)

Mr. Scott directs the needle to be introduced "about a line behind the margin of the iris," at which distance he will barely avoid the ciliary processes, "and a little lower than the transverse axis of the globe, to avoid," he says, "the ciliary artery," but where it is likely to meet one of the primary branches of that artery, which divides into two about three lines from the cornea.

After describing the common mode of operating, in which, neglecting to open the posterior capsule, but freely lacerating the anterior, the operator turns the lens over into the lower part of the vitreous humour, Mr. Scott gives an account of another method of displacing the lens, which has originated, it seems, with Mr. Egerton of Calcutta, and which consists in

pushing a straight needle into the edge of the lens, pressing downwards and backwards, so as to burst the posterior capsule, and lodge the lens behind the ciliary processes, with its posterior surface up and its anterior surface down, and then freeing the instrument from the lens by rotating it on its axis. This is a mode of operating which we think inferior, in point both of ingenuity and safety, to that of Sautconnea, the native oculist of Calcutta, of whom Mr. Breton has given so interesting an account.* Mr. Scott deems Mr. Egerton's operation objectionable unless something more is done than is mentioned above, because, says he, "the anterior capsule will probably be left entire, and if it be not previously opaque it will necessarily become so after the operation." He therefore recommends the anterior capsule to be immediately lacerated through the cornea, judging this preferable to any attempt to divide it with the needle employed through the sclerotica for the displacement, as the doing so might endanger the reascension of the lens. (p. 57.)

We must confess we are somewhat astonished to find Mr. Scott asserting, that if the anterior capsule be left entire it will necessarily become opaque, when it is well known that some of the most experienced and successful operators have made it an invariable rule to leave the anterior capsule entire.† We have no hesitation in stating, that neither in the entire nor in the lacerated state does the anterior capsule become opaque, unless as a consequence of inflammation supervening to the operation. In a little work by Dr. D. W. Soemmerring, entitled, 'Observations on the Organic Changes which occur in the Eye after Operation for Cataract,' published in German in 1828, and abounding with the most valuable information, the interior of an eye is represented in which the lens had been reclined eight years and a half before the death of the patient. The anterior capsule was found in the state of two transparent semilunar flaps.

If either of Mr. Scott's two plans of displacing the cataract be followed, and the aqueous and vitreous cavities of the eye converted into one, by lacerating the anterior capsule, the result is likely to be, *in the first place*, much more severe inflammation of the interior textures—especially of the choroid and iris—than if the anterior capsule had been left entire; and, *secondly*, a reascension, sooner or later, of the lens, which now lies at the bottom of the eye, surrounded not so much by the vitreous humour as by the aqueous, which, being probably more rapidly secreted than the vitreous, speedily infiltrates the hyaloid cells, and fills the cavity left by the revolution of the lens into its new situation.

Mr. Scott speaks of inflammation of the internal tunics of the globe, and of reascension of the lens as frequent results of the operation of displacement. Nor is this at all surprising, after the cavities of the eye are jumbled into one, by breaking down the partition which nature has placed between them.

* On the Native Mode of Couching. By Peter Breton.—Asiatic Lithographic Press, 1826.

† Acus oculo ad deponendam suffusionem immersa, et per pupillam conspicua, nusquam inter iridem et tunicam crystallinam quidquid vulgo existimatur, sed pone hanc ipsam consistit, ita ut tunica prædicta integra, sana, et sine ulla ab operatione plaga facile servari queat, modo caveatur, ne cuspis acus rursus iridem, pupillam, aut cameram oculi anteriorem, ut incaute fieri solet, agatur. Ferrein, in Haller's Disputationes Chirurgicæ, tom. v, p. 569.—Lausannæ, 1756. See also Taylor's Treatise on the Diseases of the Crystalline Humour, p. 33.—London, 1736.

Mr. Scott's appellation for division of the cataract is, *The operation by solution*, which might lead many, ignorant of the subject, to suppose that the operation was effected by solution, rather than the solution brought about by operation.

One of the interesting questions which still remain to be decided in the surgery of the eye, is the proportion of cataracts curable by solution. How frequently do we hear oculists exclaim, after an extraction is finished, and they take up the lens on the point of the capsule-needle, "Well! this is much softer than I had suspected. Had I thought it so soft, I should have divided it!"

On the one side we may, perhaps without injustice, place our present author. He tells us, that if extraction cannot be performed, "the cataract being hard, depression must be had recourse to." (p. 53.) Of the proportionate number of hard and soft cataracts he says nothing, but it is plain he is unfavorable to the operation of division, except when the lens is so soft as readily to admit of its texture being opened up by the needle.

"The operation by solution," he says, "should be confined to soft cataracts. If you attempt in this way to remove a hard cataract, several years will often elapse before its entire removal can be accomplished, and the operation will require to be so frequently repeated, that there will be great risk of its producing inflammation. When the volume of the lens has been thus diminished, there will be greater danger of the hard nucleus becoming dislocated, so as to press upon the pupillary margin of the iris and induce very serious inflammation, which sometimes will not subside until the iris is relieved from pressure by extracting the lens." (p. 61.)

On the other side, we may place Dr. Jacob, of Dublin, who, speaking of division, says:

"It is urged as an objection to this operation, that it is applicable to cases of soft cataract only. Whatever meaning may be attached to the term soft cataract, my experience leads to the conclusion, that the operation, properly modified, is applicable to the great majority of cases, perhaps to nine in ten. It is said that it often requires to be repeated; but this is a minor evil, to which we submit, in preference to incurring the risk of either of the other operations. Extraction, if unsuccessful, cannot be repeated, and a repetition of depression is not very desirable. It has been said, without the least foundation in truth, that vision is not so perfect after this as after other operations; the reverse is, I believe, generally speaking, the fact. That more time elapses between the performance of the operation and the recovery of sight than in the other operations must be admitted, but this, which may be a very valid objection on the part of metropolitan oculists, many of whose patients come from a distance, cannot be considered of great importance elsewhere, the disadvantage of delay being counterbalanced by the greater security afforded by the mildness of the operation." *

As in many similar controversies, so here, the truth lies between. Many eyes are lost by extraction, which might have been saved by division; and many destroyed by division, for which extraction alone would have been the proper operation.

Mr. Scott prefers division through the cornea rather than through the sclerotica. He says it is immaterial whether the pupil be dilated by belladonna or not. Surely the iris is less likely to be injured, if the pupil is dilated; and perhaps it is as well, in such an operation, as in most others, to see what one is about, which the dilatation of the pupil enables us to do. Mr. Scott prefers a straight needle, which is not so well adapted

* Dublin Hospital Reports, vol. iv. p. 216.—London, 1827.

for comminuting the capsule as a curved one. A needle of the general construction of Dr. Jacob's, but not quite so much curved, and not chisel-shaped, but pointed, we consider as the best.

Mr. Scott follows Conradi's plan, of one incision only through the capsule; but after a single incision, absorption goes on extremely slowly, and, if the slightest inflammation occurs, the wound of the capsule is apt to close.

Division through the sclerotica, as described by Mr. Scott, is the exploded operation of Sir William Adams, with all its gross absurdities; such as, entering the needle with its flat side parallel to the iris, cutting the lens into two halves, &c. Either Mr. Scott is totally unacquainted with any better mode of performing the posterior operation of division than this, or he chooses to describe an operation which none but a madman would attempt at the present day, as a contrast to Conradi's anterior operation, which he himself has adopted.

The pamphlet terminates with some remarks on capsular cataract, and on the use of cataract-glasses. What is said on the latter head is of the most common-place description. Mr. Scott says, "there is some variety in the focus of different glasses of the same number," but this cannot be; for the numbers of convex glasses are not arbitrary, as is the case with those of concave glasses, but express, in inches and parts of an inch, the focal length. A few glass-vendors may, indeed, mark a glass as of four and a half inches when it is of five, but a lie of this sort is detected in a moment.

ART. IV.

Recherches Expérimentales sur l'Inanition: Mémoire auquel l'Académie des Sciences a décerné, en 1841, *le prix de Physiologie expérimentale.* Par CHARLES CHOSSAT, M.D., Membre de plusieurs sociétés savantes. —*Paris*, 1843. 4to, pp. 202.

Experimental Researches on Inanition; the Memoir to which the Prize for Experimental Physiology was adjudged by the Academy of Sciences in 1841. By CHARLES CHOSSAT, M.D. &c.—*Paris*, 1843.

WERE we in a moralizing humour, we might take this Essay as a text for a disquisition on the question of the *right* of physiologists to subject other sentient beings by the score, or even (as in the present instance) by the hundred, to the severest tortures, without a sufficient probability of the deduction of some important practical inference, or of some scientific truth, which may hereafter, if not at present, be applicable to the benefit of the human race. But we must defer this subject until some future opportunity; simply contenting ourselves with the remark, that, while we regard the physiologist as justified in putting nature to the question by well-devised experiments, even on living animals in cases in which *no other* means appear likely to educe the desired results, we cannot but condemn the wholesale slaughter which is practised, apparently without the least compunction, by many continental physiologists,—too often, in mere wantonness as it would seem, without any distinct idea of the ends to be attained,—and, as frequently, for the mere *exhibition* of effects, which have been long since positively ascertained, and our knowledge of

which is not made one whit more certain or definite by the repetition of the experiment. We hold it to be the bounden duty of the experimental physiologist not to subject living animals to pain, until he has, by anatomical study, by the observation of natural and morbid phenomena, and by the due consideration of the data supplied by *comparative* anatomy and physiology, made himself fully acquainted with all that these can teach; and thus enabled himself to plan his experiment in such a manner, that he may draw from the smallest number of these trials, involving the least possible amount of suffering, the information which he seeks. Let any candid inquirer compare the *results* obtained by Sir C. Bell and Dr. M. Hall,* on the one hand, with the amount of animal suffering which they inflicted; and then make a corresponding comparison between the results obtained by Magendie, Brachet, Longet, and other wholesale French vivisectors, and *their* sacrifice of animal life, and their infliction of torture,—not upon individuals, but upon thousands of sentient beings.

We cannot but include in our censure the author of the 'Experimental Researches' now before us; since it appears that the *ends* attained are utterly disproportioned to the *means* employed; as might, we think, have been predicted by any well-judging physiologist, had the nature and plan of the experiments been set before him. Moreover, the suffering was not for a few seconds or minutes only, as in the case of most well-devised physiological experiments, but was prolonged for days and weeks; being, in fact, nothing else than the *starvation* of many hundreds of unfortunate pigeons, turtle-doves, and other animals, to ascertain their loss of weight, and other facts, of which the greater number cannot be extended beyond the particular species which were the subjects of the experiments, and which, therefore, can serve but little for the advancement of Human Physiology. We shall endeavour to select the most interesting results; that our readers may derive what benefit they can from the investigation. We must premise, however, that many points of the *most general* importance, which would have occurred, we think, to any well-informed physiologist, seem to have been utterly neglected during the whole course of the inquiry; such, for instance, is the relative *activity* of the animals during the period of starvation, which is well known to have a most important influence on the duration of life under such circumstances.

The first series of experiments relates to the diurnal loss of weight, under a total privation of food and drink. This is usually greatest on the first day, as might be expected, from the discharge of the contents of the intestinal canal, without any corresponding ingestion of aliment. The diurnal loss then usually diminishes, until past the middle period during which life is protracted; and it then commonly undergoes a sudden and remarkable increase, especially within a day or two before death. Thus, in one of the pigeons which lived the longest, the diminution on the first day was nearly 14½ grammes; on the second it was but 9½; from this it decreased until the eleventh day, when it was but 6½; but it then began to increase again, so as to be 9 grammes on the sixteenth day; 10 on the seventeenth; 12 on the eighteenth; and 14 on the nineteenth and last. In another instance, the daily loss was, 25½ grammes on the first day; by the fourth it had diminished to 12; it then began to increase

* It is to be remembered that, in a great proportion of Dr. Hall's experiments, the *sensation* of the subjects of them is destroyed *in limine.*

again, so as to reach nearly 20 on the ninth day, and 32 on the tenth and last. By the comparison of these two cases with each other, it is evident that the shorter duration of life in the second is connected with the more rapid decrease in its weight; and the same result presents itself, when the results of numerous other experiments, recorded by M. Chossat, are compared together. We are left utterly in the dark, however, as to the most important influence likely to have caused this inequality, namely, the relative amount of muscular exertion employed by the different individuals. Had this been recorded, we should have had some important data, by which to judge of the doctrine, that the *waste* of the body is in proportion to the amount in which its different functions are exercised. The increase in the excretions during the last few days of life, is a very curious occurrence; and seems to indicate that the fabric is then undergoing more rapid disintegration,—a view which corresponds with the fact, that the bodies of persons that have died of starvation very early exhale a putrescent odour, which is even manifested before death; as if the solids and fluids were already subjected to those changes, which usually take place some time subsequently to dissolution. It is probable that the colliquative diarrhea, which so frequently manifests itself at the termination of exhausting diseases, is to be regarded as an analogous occurrence; and that it is rather the *effect* of the near approach of death, indicating that the organic structure cannot any longer hold together, than the cause of the fatal termination, as it is usually regarded.

It appears, from M. Chossat's experiments, that whether life during inanition be more or less prolonged, the total loss, compared with the original weight of the animal, is always nearly the same in the same species. The average, in warm-blooded animals, he states to be about 40 per cent.; but there is a considerable variation in this limit; for in two fowls it was nearly 53 per cent., whilst three guinea-pigs died when the loss had reached (on the average of all) 33 per cent. One of the circumstances which most influence the amount of sustainable loss of weight, is the quantity of fat previously accumulated; for it will be shown hereafter, that fat is almost entirely removed during inanition; and, consequently, those who previously possess most of it have most to lose during the process. This is the explanation of the greater proportional loss of weight in the two fowls, which were previously very plump, than in the pigeons and turtles, in which it was from 38 to 41 per cent.

It has been long known that *age* has a most important influence in modifying the prolongation of life during inanition; the life of the adult being usually extended much beyond that of the child or the aged person; and on this principle are founded the presumptions of survivorship in forensic medicine. We might have reasonably expected some important information on this head from M. Chossat's researches; but we are altogether disappointed, in consequence, it would seem, of his not being able to ascertain the relative ages of the subjects of his experiments. He endeavours to form an estimate of their respective ages by their relative weights, classing his turtle-doves as *young*, *middle-aged*, or *adult*, according as their weights were beneath 120 grammes, from 120 to 160, or above 160. We need hardly stop to point out how very fallacious must be any such criterion of age; since there must be differences in weight among individuals of the same age that would cause one of them to be

placed as young, and another as adult. But the result is interesting, when viewed merely as bearing upon the question of the duration of life, and the loss of substance during inanition, in animals of different weights.

	Weight of the Body.		Loss of the Body.			
	Weight at commencement.	*Weight at death.*	*Entire absolute loss.*	*Proportional loss in 1000 parts.*	*Daily proportional loss.*	*Duration of life.*
	Gram.	Gram.	Gram.			
a. Young .	110·42	82·84	27·58	0·250	0·081	3·07
b. Mid.-aged	143·62	91·60	52·02	0·362	0·059	6·12
c. Old .	189·36	101·61	87·75	0·463	0·035	13·36

It will be perceived, from this comparison, that the entire *actual* and *proportional* loss were both much greater in the heaviest animals; but that the diurnal loss was much the most rapid in the lightest; and the general result may probably be received as confirmatory of the previously-received opinion—the difference in the duration of life being much greater than could be accounted for on the previous *condition* of the animal simply, and evidently resulting in great part from the more rapid *waste* which takes place in the young animal.

Another series of experiments of the same kind was made upon frogs, the duration of whose life, when they were placed in pure water frequently renewed, but without any food whatever, varied from six to sixteen months. Notwithstanding this great difference in regard to time, the actual amount of loss sustained was very nearly the same, in proportion to the previous weight of the body, as in birds; being usually from 33 to 48 per cent., although reaching, in two cases, to 54 and 58 per cent. Other experiments were made upon various species of cold-blooded animals, with the same general result; which, when compared with that obtained from all the experiments on warm-blooded animals, becomes additionally striking.

		Proportional Loss of Weight.	
	Average Duration of Life.	*Daily loss in 1000 parts.*	*Entire loss in 1000 parts.*
Warm-blooded Animals	9·68 days.	0·0420	0·397
Cold-blooded Animals	226·0 ,,	9·0021	0·404

The duration of life, in the second class of animals is seen to be *twenty-three* times that of the first; but, on the other hand, the proportional daily loss is no more than one twentieth part, in the cold-blooded animals, of its amount in the warm-blooded: so that the entire loss comes to be very nearly the same; or, in other words, the cold-blooded animal dies at the same amount of *inanition* as the warm-blooded; but is longer in reaching the limit.

The object of the next series of experiments was to determine the result of *insufficient* alimentation. A number of turtle-doves were supplied with limited quantities of corn, but with water at discretion; and two very interesting results presented themselves. In the first place, the amount of loss was almost exactly the same as in the case of complete abstinence; but life was prolonged for about double the length of time. Secondly, it appeared that in scarcely any instance was the whole amount

of food that the birds were allowed to take actually digested; a part of it being rejected by vomiting, or passing off by diarrhea, or accumulating in the crops. It seems that the vital power was not sufficient to furnish the requisite supply of gastric fluid, when the body began to be enfeebled by insufficient nutrition; or, perhaps we might well say, the materials of the gastric fluid were wanting. We need scarcely point out the very important practical applications of this principle. The loathing of food, often manifested by those who have been subjected to the influence of an insufficient diet-scale in our prisons and poor-houses, has been unjustly set down to caprice or obstinacy, and punished accordingly; whereas it is actually a proof of the deficiency of the supply, which, it might be imagined, would have been voraciously devoured if this were really the case.

The next subject considered is the influence of deprivation of water; and here we encounter so many sources of difference, arising from the variations which exist in the demand for water among the several tribes of animals, that it is impossible to arrive at any *general* conclusion. Thus, birds naturally drink but very little; for the amount of their loss of fluid by excretion is very small, and a little, therefore, serves to replace it.*

When a number of pigeons and turtle-doves were totally deprived of solid aliment, and were freely supplied with water, it was found that they did not drink above one fifth or one sixth of their natural quantity. There was no decided difference in the duration of life, between the pigeons that were deprived of liquid as well as of solid aliment, and those which were freely supplied with the former; but in the turtle-doves, the duration of life was more than *twice as great* in those which were deprived of water, as in those which were freely supplied with it. This unexpected result M. Chossat explains by saying, that the weight of the former series was greater by a fourth than that of the latter; but on this we would remark, that by neglecting to select animals for comparison which were as nearly as possible in the same circumstances, M. Chossat appears to us to have shown great carelessness—we would say culpability; for, by this omission, a number of birds were subjected to the pangs of a lingering death by starvation, to produce a result altogether valueless. The rabbit was the only mammal on which an experiment of this kind was made; and only a small number were subjected to it. The duration of life appears to have been sensibly greater, however, when water was supplied than when it was withheld, being nearly thirteen days in one case and ten and half in the other; and the difference would probably have been more striking, had animals of the same weight been selected for comparison, for M. Chossat remarks that the animals which lived the longest

* We are not aware that any attempt has ever been made to assign the *rationale* of this. The following may be thought an approach to it. Of the quantity of fluid which *we* take in, a large proportion is thrown off by cutaneous and pulmonary exhalation, serving to keep down the temperature of the body to its proper standard. The kidneys act as a kind of safety-valve, regulating the amount of fluid in the vessels, and allowing more to pass off in proportion as the pressure in the vessels is increased, in consequence of the larger amount ingested, or the diminution of the exhalation by cold, &c. Now in birds, the natural temperature of the body is 10° or 12° above that of the mammalia; and there can be but little need, therefore, of cutaneous exhalation to keep it down. No more fluid, therefore, is required within the body than is requisite for the general purposes of nutrition; and the excretion of the kidneys is voided nearly in a dry state.

were the lightest. From the experiments of Redi it appeared that the duration of life in a fowl totally deprived of food, but supplied with water, was twenty days; whilst those deprived of water also did not live above nine. From a considerable number of observations made on man, it is indubitable that, under ordinary circumstances, a moderate supply of water is favorable to the prolongation of life; and those instances in which the life of man, or of other mammalia, has been prolonged to the greatest extent *without* water, are those in which, from the peculiarity of the circumstances, the cutaneous exhalation must have been reduced to a very small amount, or in which there may have been an actual absorption of water by the skin and lungs. Thus, Fodéré mentions that some workmen were extricated alive, after fourteen days' confinement to a *cold, damp* cavern, in which they had been buried under a ruin. The remarkable case of the hog which was buried in its stye for 160 days, under thirty feet of the chalk of Dover cliff, and was dug out alive at the end of that time, reduced in weight from 160 lbs. to 40 lbs., is well known. In this case the temperature would be kept at a moderate standard by the depth at which the animal was buried; and the air within the small hollow in which it was inclosed would soon become sufficiently charged with moisture to resist any further evaporation. We need scarcely allude to the case recorded by Dr. Willan, in which a young gentleman voluntarily abstained from everything but a little water, just flavored with orange-juice, for upwards of sixty days; in this we have no doubt that the peculiar state of the nervous system exerted an influence (though we do not pretend to assign the mode of its operation,) upon the bodily structure in general, as we see it do in hysterical subjects. In a case of this nature which has fallen under our own observation, and in which we are fully satisfied that there was *no deceit*, there was *complete* abstinence from all solid food during more than three weeks, a small quantity of tea and toast-water being the only fluids ingested, or on some days not even that; and yet, at the end of that period, the flesh was as firm, the voice as strong, and the muscular strength as great, as at the beginning. On two occasions on which, by the entreaty of her friends, the patient was induced to take a morsel of solid food, it was immediately rejected with much violence. The influence of water in prolonging life is particularly shown in reptiles, and especially in the naked-skinned batrachia. A frog, for example, kept without water in a dry atmosphere will lose in a few hours, from the surface of its body, so much water, that its life cannot be prolonged, and it will die of desiccation; but if placed in an atmosphere loaded with dampness, it may be kept alive for a long time, without any supply of liquid.

In order to determine the results of a *forced ingestion* of water, to a larger amount, M. Chossat daily injected a certain quantity into the crops of several turtle-doves, which were totally deprived of food. The result was, that their daily loss of weight was *greater* and the duration of their lives was much *less* than that of birds totally deprived of water. Moreover, they died before they had reached the usual degree of reduction, apparently in consequence of the positively injurious effects of the ingestion of an excessive quantity of water; for it was found, on examination after death, that the blood was more fluid and less disposed to coagulate than in other cases, and that aqueous deposits were present in the lungs, pericardium, &c., impeding the action of the vital organs.

We shall now give a brief sketch of M. Chossat's detailed account of the relative degree of loss sustained by the different organs of the body during complete inanition. The following table presents them in a general form. It will be recollected that the mean or *average* loss of the *whole* body is about ·4; and that of the different organs is set down in the table according as it is above or below this average.

Parts which lose more *than the mean* 0·400		*Parts which lose* less *than the mean* 0·400	
Fat	0·933	Muscular portion of the stomach	0·397
Blood	0·750	Pharynx and œsophagus	0·342
Spleen	0·714	Skin	0·333
Pancreas	0·641	Kidneys	0·319
Liver	0·520	Respiratory apparatus	0·222
Heart	0·448	Osseous system	0·167
Intestines	0·424	Eyes	0·100
Muscles of locomotion	0·423	Nervous system	0·019

The almost total loss of the *fat* is precisely what we should expect; knowing, as we do, that this substance is chiefly deposited as a *store*, to be had recourse to in time of need. The reduction in the quantity of blood was measured, not by the simple diminution in its bulk, but by comparison with the amount of blood *of the same quality* in the healthy animal. For the blood of an animal that has died of inanition, is not only much less in bulk, but much poorer in the proportion of its solid contents, than that of a healthy subject; and in order to make the comparison exact, M. Chossat diluted the latter with water, until it exhibited the same amount of attenuation. This seems to us a very inexact mode of comparison; how much better it would have been to have evaporated all the liquid part of the blood, and to have compared the weight of the solid residuum. That the proportional diminution of the blood, however, is far beyond that of the body at large, is evident from this fact,—that in the pigeon, the proportion which the blood bears to the *original* weight of the body is about ·033 in the healthy state, and only ·013 in the inanitiated, whilst the proportion which the blood bears to the *final* weight of the body in the inanitiated animal is ·021. In the rabbit, the proportion which the blood in the vessels at death bears to the *original* weight of the body, is ·0097 to 1; whilst to its final weight it is ·0156 to 1; these proportions, though so different from the preceding, are the same *to each other*, showing that the *relative* diminution in the amount of blood was the same in both instances. The diminution in the size of the spleen is just what we should expect, from our idea of its character as a reservoir or diverticulum of blood; that of the pancreas and liver might be expected to be considerable, from the cessation of the digestive process to which they minister. A very curious circumstance is recorded by M. Chossat, in regard to the state of the blood and liver, in some of the frogs which died after a very prolonged inanition. Scarcely any traces of red blood were found; but it was replaced by a black fluid, resembling diluted cuttle-fish ink, which filled the vessels. The alteration in the character of the liver was so striking, as to give rise to the idea that it was the seat of the change; it had lost its usual colour, and assumed a dark hue, so strong as to leave a permanent spot upon paper, like that made by Indian ink; the bile of the gall-bladder, however, was particularly liquid, and was either green or of a reddish-brown. How much it is to be regretted that a microscopic examination of the state of the blood, and of the tissue of the liver, was not made in these instances! The cruel

experiment must now be repeated; before even a probable guess can be hazarded, as to the nature of this curious alteration. On the subject of the proportional diminution in the size of the heart, M. Chossat enters into some curious calculations—the practical use of which, however, does not seem to us to be very evident—in regard to the force of the heart at different ages as compared with that of an inanitiated animal. From these he deduces that, whilst in the normal condition, a heart of 4·17 grammes corresponds in the pigeon with a body of the length of 262 millimeters, and with adult age, a heart of 2·47 granules, (the weight to which this organ is reduced by inanition,) corresponds with a body of 195 millimeters in length, and with an age of only fourteen days; or in other words, the heart of an inanitiated pigeon is no larger than that of a healthy pigeon of fourteen days old. Applying the same results to the human body, he calculates that the heart of man would be reduced by inanition to the size of that of a child of eight or ten years old. The disproportion will probably be still greater, when its relative *powers* is compared, an element left out of consideration by M. Chossat; for it cannot but be supposed that, in two hearts of the same size, the contractile power would be *much greater* in that of the vigorous child than in that of the starved adult. As the muscles of locomotion make up a large part of the bulk of the body in vertebrated animals, and especially in birds, we might anticipate that their reduction would nearly correspond with the average of the whole; and this we see to be the case.

Passing on now to those organs in which the reduction is *less* than the average, we observe that the loss sustained by the muscular portion of the stomach is nearly the same with that of the muscular system in general; but M. Chossat records the curious fact that the thick and horny epithelium which lines the cavity, not only suffers no decrease, but an absolute increase in its weight. This increase is due, however, to an infiltration of fluid; for when dry, the epithelium is not found to have increased, but rather to have diminished, though not in the same proportion with most other parts. A certain degree of softening was observed, resembling an incipient digestion, in the epithelium in the neighbourhood of the cardiac; and pyloric orifices.—The comparatively small diminution in the weight of the lungs and kidneys, is what might have been anticipated, considering that their functional activity as excreting organs undergoes a less diminution than that of most other parts.—The small amount of change in the weight of the *bones*, too, might have been anticipated; knowing, as we do, that they *waste* but little, in comparison with the softer textures. But the most remarkable of all the results supplied by this examination is the maintenance of the normal weight of the nervous centres; the diminution of which was scarcely appreciable in their ordinary state; and but very small when the amount of their solid matter was compared with that of the normal brain and spinal cord, by drying both. Thus amidst the general ruin of the body, the nervous system is kept as nearly as possible in its normal condition, so long as the means of nutrition are supplied to it. We cannot help thinking that the cessation of this supply is often the immediate cause of death. Believing, as we think there is good reason to do, that every act of the nervous system involves a certain disintegration of its substance, and a corresponding demand for reparation, it is easy to see that the suspension of the supply must cause an immediate cessation of its operations; this we

take to be the cause of the insensibility in syncope, and in Sir A. Cooper's well-known experiment,—the suspension of the flow of blood to the brain by ligature of the vertebral arteries and pressure on the carotids. The maintenance of the normal weight of the brain, and the general disappearance of the fat, seem to indicate that the former is nourished chiefly at the expense of the latter. The substance of the brain and nerves is well known to be (chemically speaking) an azotized fat; and there are many circumstances which seem to indicate that it is formed, not by a metamorphosis of albumen, but at the expense of fatty matter;* and if this be true, the store of fat laid up in the adipose tissue has a function much more important, than that of merely sustaining the respiration. Future chemical researches may perhaps throw light upon this question.

In proceeding to investigate the influence of inanition upon the amount of heat generated, it was necessary, in the first instance, to ascertain the amount of variation which might take place within the limits of health. From a considerable number of observations, M. Chossat concludes that the temperature of the animal at noon and midnight pretty nearly represents the maximum and minimum, and thus affords the means of readily determining the extreme variation. This last, in the healthy state, may be regarded as about 0°·74 cent., but in the state of inanitiation it averages 3°·28 cent., gradually increasing, from its commencement to its termination. Moreover, the gradual rise of temperature which should present itself between midnight and noon is retarded, and the fall subsequently to noon commences much earlier than in the healthy state; so that the *average* temperature of the body is much lower, even when (as sometimes happens) the maximum temperature remains each day nearly at the natural standard, or is even a little elevated. From the mean of all the experiments it appears, that the average loss of heat between the commencement of the inanitiation and the end of the *penultimate* day of life was about 2°·5 cent.; and dividing this by the average number of days through which life was prolonged, it seems that the average daily loss was no more than 0°·3 cent. But on the *last* day the production of heat diminished very rapidly; and the thermometer fell from hour to hour, until death supervened—the whole loss being, on the average of all the experiments, about 14° cent., or about 47 times as much as on any previous day. It further appeared that the time of death usually corresponded with that of the diurnal depression; for, out of 52 animals experimented on, 36 died between noon and midnight, which is the period of natural diminution, and only 16 between midnight and noon, at which period the temperature is naturally ascending. Perhaps it would have been fairer to compare the twelve hours of the day (from six to six o'clock) with the twelve hours of the night—the whole period of the greatest elevation with the whole period of the greatest depression; and we have little doubt that the result would have been then still more favorable to the doctrine of M. Chossat, who regards the *last* depression as merely a sort of exaggeration of the preceding ones, from which the animal has not power to recover. The *total* average depression at the time of death was about 16·3° cent. or 29·3° Fahr., and the mean temperature of the

* The effect of alcohol in stimulating the nervous system to increased activity seems explicable in some degree by its similarity of composition.

animals at that period was about 76·8°. It is to be regretted, however, that there is no separate statement of the temperature of the birds and the mammalia experimented on, since the difference in their natural standard renders it evidently improper to associate them in such a comparison. In 18 out of 41 cases the temperature at the time of death was between 18·5° cent. (the minimum,) and 24°, or between 65·5° Fahr. and 75°; and in 21 it was between 75° and 86°, in two cases only was it above 86°.

No attempt was made by M. Chossat to determine the relative amount of carbonic acid exhaled at the different periods; but he made observations upon the number of respiratory movements, which show that these diminish in a like proportion. The average number per minute in a state of health was, in the pigeons 31 and in the turtle-doves 49. The mean of the observations between the first and penultimate days gave 23 for the pigeons and 40 for the turtle-doves, and on the last day of life the average was only 19 for the pigeons and 29 for the turtle-doves, the reduction being about 40 per cent. in each. Moreover, it seemed that the actual amount of carbonic acid exhaled did not bear even the usual proportion to the number of respirations; the diminution in the weight of the body being no greater, for some hours before death, than could be accounted for by the evacuations and the cutaneous exhalation; so that it seemed as if the calorifying process had been almost entirely checked for some hours previously. It is remarkable that the number of respirations at midnight should be actually greater, in inanitiated animals, than at midday, though still inferior to the normal standard; or, in other words, the relative diminution is much greater for the diurnal than for the nocturnal respirations. This appears to result from the restlessness which is characteristic of the sleep of animals that are undergoing the process of starvation.

The following are the general symptoms which, according to M. Chossat, presented themselves to observation: In general, the animals remain calm during the first half or two thirds of the period; but they then become more or less agitated, and this state continues for as long as the temperature remains elevated. On the last day of life, however, this restlessness ceases, and gives place to a state of stupor. The animal, when set at liberty, sometimes looks around with astonishment, without attempting to fly, and sometimes closes his eyes, as if in a state of sleep. Gradually the extremities become cold and the limbs so weak as no longer to be able to sustain the animal in the standing posture; it falls over on one side, and remains in any position in which it may be placed, without attempting to move. The respiration becomes slower and slower; the general weakness increases, and the insensibility becomes more profound; the pupil dilates; and life becomes extinct, sometimes in a calm and tranquil manner, sometimes after convulsive actions, producing opisthotonic rigidity of the body.

The observations upon the amount of fecal matter voided by the inanitiated animals are not altogether satisfactory; being exact only as regards their quantity, and taking little account of their quality. After the first day, (in which the fæces contain the residue of the food previously taken,) their amount is very small; and they seem to consist principally of *grass-green biliary matter*. This observation is evidently opposed to

Liebig's doctrine of the reabsorption of the bile; and is more particularly striking, because if this takes place at all in the manner represented by him, we might imagine it to be especially active, when there is such an *exigeant* demand for the materials of respiration. Towards the close of life, the fæces contain a much larger quantity of water, even when none has been ingested by the animal; and besides the green matter, they are seen to contain white saline matter,—the neglect of the examination of which would have greatly surprised us, if we had not seen in former parts of this Essay, that M. Chossat seems determined to use the *balance* as his only instrument for estimating the condition of the animals experimented on, and regards any departure from his system of weighing, even for the most important purposes, as an injurious interference with his plan. He again recurs to the fact of the duration of life being greater, as the evacuations are less; but offers no explanation of the variation.

Desirous of testing the correctness of his idea that the cooling of the body is the immediate cause of death, M. Chossat tried the ingenious experiment of placing animals, whose death seemed impending, under the influence of artificial heat; and the result of this trial was very remarkable. In every instance he delayed subjecting the animals to this influence, until his experience of their state led him to believe that their death must be very near; and in several cases the animals died whilst he was performing the processes of weighing, &c., preparatory to placing them in the *rechauffoir*. The result was in general to restore those yet alive, from a state of insensibility and want of muscular power, to a condition of comparative activity; their temperature rose, their muscular power returned, they flew about the room, and took food when it was presented to them; and, if the artificial assistance was sufficiently prolonged, and they were not again subjected to the starving process, most of them recovered. If they were left to themselves too early, however, the digestive process was not performed, and they ultimately died. Up to the time when they began to take food, their weight continued to diminish; the secretions being renewed, under the influence of artificial heat, sometimes to a considerable amount. It is not until digestion has actually taken place (which is commonly many hours subsequently to the ingestion of the food), that the animal regains the power of generating heat; up to that period, the heat which its body has acquired from external sources, is lost as soon as ever the supply fails; and thus M. Chossat lost many animals by the accidental cooling of his stove during his absence. This is evidently a point of much practical importance; and the neglect of sufficient *artificial calorification*, or the too early suspension of it, has doubtless been a frequent cause of the want of success of the means taken to recover inanitiated persons. Several of M. Chossat's birds were lost from the same cause; and until he arrived at the general principle—that the heat must be artificially sustained, until the quantity of food actually *digested* is fully equal to the wants of the body, he seems to have been unable to account for his results. It is to be remembered that, in these instances, the resources of the body are on the point of being completely exhausted, when the attempt at reanimation is made; consequently it has nothing whatever to fall back upon; and the leaving it to itself *at any time* until fresh resources have been provided by it, is consequently as certain a cause of death, as it would have been in the first instance.

In the application of heat to bodies of larger size than the small animals experimented on by M. Chossat, it is to be remembered that a longer time will be necessary for them to become equally affected by it; and means should be taken to apply it more effectually. The warm bath, and, still better, the contact of warm solid bodies with a large part of the surface, should be employed in preference to simple heated air. The same rule applies to the case of children born so prematurely as to require artificial modes of sustaining their heat. In one of the most remarkable of these upon record, it was soon found that no means of applying the warmth were so effectual, as contact with the warm body of another person; and by relays provided for the purpose, this was maintained almost uninterruptedly during the first three weeks of the infant's extra-uterine life. It was observed that, when this was intermitted for the purpose of changing the dress, the child's powers immediately began to flag; although the operation was conducted before a fire, and consequently in an atmosphere at least as hot as its own body.

The memoir concludes with some remarks by M. Chossat on the frequency of *inanitiation* as the real cause of death, in various exhausting diseases. Upon this point we feel much inclined to agree with him; especially since his inquiries upon insufficient alimentation have shown, that this produces effects precisely the same in character with those resulting from complete deprivation of food, though somewhat more tardy in their appearance. It is especially, perhaps, in those forms of febrile disease, in which no decided lesion can be discovered after death, that this view has the strongest claim to reception; and it is here, too, that its practical applications may become most important. For if, as we have good reason to believe, the morbific cause is temporary in its influence, it follows that if we can sustain the system, until it has passed away, the patient who would otherwise have sunk under it may recover. By way of analogy, we may refer to those cases of narcotic poisoning, in which recovery has been due to the artificial maintenance of the respiratory process, during the period when it would have been checked by the narcotism. Now we cannot support the system in fever by *aliment*, for this would not be digested, even if it were taken into the stomach. But we well know the beneficial effects of alcohol in its advanced stages; and the large quantity of this stimulus that may be administered in many cases of fever, is a matter of familiar experience. Now admitting that its beneficial operation is partly due to its specific effect upon the nervous system, we cannot help thinking that we are to regard it as also resulting from the new supply of combustible material, which is thus introduced in the *only* form in which it can be taken up by the vascular system. If we turn our attention for a moment to the state of the digestive apparatus at this period, we shall at once see *why* no other substance should answer the same purpose. In the advanced stage of fever, the secretion of gastric fluid, and the *special absorbent* process which takes place through the villi and lacteals, seem to be in complete abeyance. Still, however, simple *imbibition* may go on through the walls of the blood-vessels, provided that the circumstances are favorable for the production of endosmose; that is, provided the fluid in the alimentary canal is *less dense* than the blood. Now the substances on which we ordinarily depend for the support of the respiratory process, are either of an *oily*, a *saccharine*,

or a *mucilaginous* character. Oily substances *cannot* be taken in by imbibition; since they completely check the endosmotic current. Saccharine and mucilaginous substances can only be taken in, when their solution is so dilute, as to be of a density much inferior to that of the blood; hence they must be given in a large bulk of fluid: a practice of which experience has shown the benefit. But alcohol, being already of a density far inferior to that of the blood, is easily absorbed; and, from deficiency of other materials, it is rapidly consumed, so that a very large quantity may be thus ingested, without its stimulating effects being perceptible; just as we see that, in a very cold atmosphere, large quantities of spirituous liquors may be taken with impunity, on account of the rapid combustion they undergo.

Now if there be any truth in these views, there is an obvious deduction from them, of the highest practical importance, viz., that in the advanced stages of fever, when death seems impending, we should endeavour to ward it off by a liberal supply of artificial heat. We have already seen the extraordinary results which this produced upon M. Chossat's starved pigeons and turtle-doves; and we see no reason why similar beneficial results should not present themselves in the case of patients *inanitiated* by fever, though they will be, of course, greatly modified by the morbific cause, so long as it remains in the system. We would earnestly suggest a trial of this expedient, which the simple hot-air bath, now used in many of our hospitals, will readily permit, to those of our readers who may have the opportunity of putting it in practice. We do not *promise* success; but we think that we have shown good physiological grounds, why it may be reasonably expected. We should warn them, however, that the continuance of this external aid for a few hours, or a day or two, is by no means sufficient; but that it must be afforded until the digestive powers are sufficiently re-established, to afford the requisite support to the system through the legitimate channel.

In taking our leave of M. Chossat for the present, we would express our strong sense of the importance of his contribution to experimental physiology; but we should not be discharging our duty to ourselves and to our readers, if we did not at the same time enter our decided protest against the limitation of the scope of his inquiries, which he has assigned to himself. Instead of 'Experimental Researches on Inanition,'—a title which led us to expect a full inquiry into the Morbid Anatomy and Chemistry of the solids and fluids of the animals subjected to experiment, —the heading of this essay should have been 'On the Weight and Temperature of Animals undergoing Starvation.' We fear that M. Chossat was thinking more of the prize to be adjudged by the Academy of Sciences than of the sufferings of the animals he was sacrificing; and whilst we are far from blaming him for undertaking the inquiry, and should by no means quarrel with him for thus restricting the scope of his investigations on any subject that did not involve animal suffering, we *do* blame him for so planning his experiments and observations, that, by the omission of several most important points of inquiry, he has rendered it necessary, for the completion of the history of Inanition, that a similar amount of torture should be again inflicted upon beings that have sensations as acute as our own.

Art. V.

The History, Diagnosis, and Treatment of Typhoid and Typhus Fever; with an Essay on the Diagnosis of Bilious Remittent and Yellow Fever. By Elisha Bartlett, m.d., Professor of Medicine in Transylvania University.—*Philadelphia,* 1842. 8vo, pp. 394.

This work has been written, as the author informs us in his preface, to supply what he regards as an acknowledged want in the medical literature of the United States,—a treatise on fever which shall be a safe guide to its practitioners. The British works on the subject, such as those of Drs. Armstrong, Southwood Smith, and Tweedie, are not adapted to this purpose, from the material circumstance that the fever which chiefly prevails in this country, and whence, consequently, British writers have drawn their descriptions, is, according to Dr. Bartlett, specifically different from that found in the United States; and, according to other observers, varies, at least, considerably from it; whilst the work of Louis, of which America possesses a translation from the pen of Dr. Bowditch, though constituting one of "the few imperishable monuments reared in the pathway of our science," is not adapted to the wants and tastes of the majority of practical men.

The form of continued fever prevailing in the United States, the author shows to be that to which Petit and Serres, in 1813, gave the name of Entero-mesenteric Fever; which Bretonneau has called Dothinenterite; Cruveilhier and others, Follicular Enteritis; the Germans, very appropriately according to our opinion, Abdominal Typhus; and Louis, Gerhard, Jackson and others, Typhoid Fever. The history of this fever—its symptoms, anatomical character, diagnosis, mortality, theory, treatment, and definition, occupy the first part of the volume. This portion is very creditable to the observation, judgment, and literary research of the writer. The Second Part comprises the history of typhus. This is avowedly less original than the first part; its materials being derived chiefly, as its writer admits, from British physicians, especially those of Ireland and Scotland.

These varieties, or, as Dr. Bartlett would say, species of fever, were so fully discussed in former numbers of this Journal,* that we do not feel ourselves called upon to examine at any considerable length these two portions of the work. We might, indeed, have passed them over with that general note of approbation which they unquestionably merit, had there not been mingled in them some controversial matter addressed to ourselves. Into this we do not purpose entering at any considerable length; but to pass it entirely unnoticed might be interpreted to imply either want of confidence in our own opinion, or of respect for the authority of Dr. Bartlett; and we are possessed with neither of these feelings. It will be manifest, from the annexed extract, that we have no occasion to complain of the spirit of the author's criticism. The candid advocacy of truth, or what we conceive to be truth, is our quarterly vocation; and far be it from us to object to others labouring in our own very creditable calling.

"I shall conclude this historical survey of facts and opinions, bearing on the

* See British and Foreign Medical Review, vol. XII, pp. 22 and 294.

question of diagnosis before us by a short reference to an article contained in the July and October numbers of the 'British and Foreign Medical Review' for 1841. This article contains a pretty full exposition of the subject under consideration, and abating some mere smartness in its criticisms of Christison, Gerhard, Lombard, and Starbach, it is written in a good spirit, as well as with fairness and ability. Its noble tribute to Louis has already been noticed. The writer of the paper, after an examination of all the accessible and valid evidence in the case, comes to the conclusion, that the contagious typhus of Great Britain and the typhoid fever of France are different varieties, only, and not distinct species of disease. I have already gone over nearly all the ground occupied by this writer; I shall have occasion, therefore, to notice only two or three of his statements and opinions. The most important of these, in its connexion with the diagnosis of the two diseases, is this: in his tabular comparison of typhoid fever and typhus, he sets down, so far as the abdominal lesion is concerned, as typhus, all the cases of fever occurring in Britain; thus settling, beforehand, the very question at issue, in relation at least to one of its elements. The writer admits, that the two forms of fever may generally be distinguished during life; but alleges that there are cases in which such distinction cannot be established. The number and authenticity of these latter is certainly, thus far, very limited; and if a difference of symptomatology, sufficiently marked to be generally and readily recognized, corresponding constantly with a most important difference in the state of certain organs found in fatal cases, is not adequate to constitute separate diseases, it is not easy to see in what radical nosological distinctions are to be found. In order to account for the great differences in the appearances of the eruptions of the two diseases, the reviewer suggests the hypothesis, certainly improbable and gratuitous enough, that the lesions of the skin and of the intestine may be supplementary of each other; a most facile method, assuredly, of disposing of a difficulty." (pp. 308-9.)

Dr. Bartlett is not correct in stating that we have, in the tabular view he refers to, set down, so far as the abdominal lesion is concerned, as typhus, all the cases of fever occurring in Britain. The question we endeavoured to decide was, that of the identity or non-identity of the fever of France and Great Britain; and for the attainment of this object we placed in parallel columns the symptoms, anatomical lesions, &c., observed by the writers of the two countries on their respective fevers, and the heading of the table showed that such was our intention in its construction. We were holding up to view facts as presented to us by the best writers in both countries. We were not regarding anything as decided, but were furnishing materials for decision. Our classification throughout was into British and French, not typhus and typhoid. That we were not irrespective of facts tending to identify a proportion of the cases occurring in England with "the typhoid form," is manifest from the following remarks in the table, under the head of anatomical characters: "A special lesion of the patches of Peyer is of extremely rare occurrence, as a general proposition; but in almost all, or in actually all the cases examined at certain periods of the year, or in certain situations that lesion is discovered. When it does exist, the phases through which it passes, and the influence it exercises on the mesenteric glands, are the same as in France." (Brit. and For. Med. Rev., vol. XII, p. 324.) We certainly stated that the form of continued fever, attended with disease of the ileum, may be commonly distinguished by its *local abdominal symptoms* from a fever not so attended; and the author, omitting the words we marked in italics, and connecting this unqualified statement with the general detection of the Peyerian lesion in those examined after death, exclaims, "if a difference of symptomatology sufficiently marked to be

generally and readily recognized, corresponding constantly with a most important difference in the state of certain organs, found in fatal cases, is not adequate to constitute separate diseases, it is not easy to see in what radical nosological distinctions are to be found." To this we would in the first place reply,—that any one can distinguish, at a glance, confluent from distinct smallpox; but no one, therefore, regards these diseases as specifically different. With regard to the argument derived from pathological anatomy, it appears to us to be divested of its weight, in great measure, by Dr. Bartlett's own statements:

"I do not think," he says, "that we are justified in referring typhoid fever, considered as a disease, as an integral, though complex pathological condition and process, or series of processes, to this single local lesion of the intestines. It seems to me much more satisfactory and philosophical, much more in accordance with what is seen in many other diseases, to look upon the lesion of the elliptical plates, not as the local cause of all the other appreciable phenomena of typhus fever, but as constituting one of the pathological elements in a very obscure and complex disease; all which elements, and this quite as much as the others, are themselves the result of some morbific agent, or influence, or process, the nature, sources, and operation of which are wholly unknown to us." (pp. 74-5.)

In a subsequent passage in relation to the view which regards typhoid fever not as an essential or idiopathic fever, but an enteritis, or a follicular enteritis, or a dothinenteritis, and assigns to it a nosological position among the local phlegmasiæ, he remarks:

"The most obvious objection to this view of the nature of typhoid fever consists in the circumstance, that there is no uniform proportion between the extent of the local disease and the severity of the symptoms. There are many fatal cases in which the intestinal lesion is very limited in extent; there are others where the whole character of the disease has been unusually mild, and in which, when life has been destroyed by some secondary and accidental complication, the alteration of the intestine has been found to be very extensive and profound." (Bartlett, p. 141.)

We are not yet convinced that this one of the elements of a very complex disease, and an element between the extent of which and the general severity of the disease there is no proportion, granting that it is almost invariably existing, (Dr. Bartlett labours to prove that it is, without qualification, invariable, but, we think, with more skill than success,) should be considered to establish an impassable barrier, a broad and specific distinction between the fevers existing in France, the United States, and other parts of the world, and one prevailing in this country, bearing in all other respects—etiology, mode of invasion, symptomatology, and general course—the closest possible relation to it, and frequently commingled with it during the same epidemic in the wards of the same hospital.

We remain, then, of the opinion that we expressed some time ago,* that the continued fever of England and France, and we would add too, of America, are the same species of disease, but that they are different varieties of this species; and we find our opinion confirmed by the Report of M. Landouzy on the epidemic in the jail at Rheims, a report quoted at great length by Dr. Bartlett, and by which he admits that some doubt is thrown on the specific difference of the two diseases.

The epidemic in question was confined to the inmates of a certain quarter of the prison at Rheims, and prevailed between the 1st of Octo-

* See British and Foreign Medical Review, vol. XII, p. 326.

ber, 1839, and April, 1840. The entire number of cases was 138, 103 of which were amongst the inmates of the prison; the remaining 35 consisting of physicians, medical students, nurses, and others connected with the hospital where the patients were treated. An important point connected with these cases is, that they all came under the observation of the medical attendants immediately on the commencement of the disease. Among the first symptoms was stupor, which frequently showed itself as early as the second or third day, and continued until it was lost in coma or delirium. It differed from mere somnolence and coma. The expression of the countenance was that of half-demented and stupid astonishment. It was the *stupor attonitus* of Foes. In half the cases it was strongly marked, in the other half it was slight in degree. True somnolence and coma appeared in a certain number of cases, later in the disease, often about the tenth day. Profound coma, so that the patient could not be roused, existed in only twelve cases. Delirium was very common, usually making its appearance between the third and the eighth day. It was generally low and muttering in its character, and, in fatal cases, it continued until death. Headach was uniformly present at the commencement of the disease. It was, for the most part, dull and heavy, and felt especially over the eyes. It continued for an uncertain period of time, gradually disappearing or losing itself in coma or delirium. *Subsultus tendinum* was common, and strongly marked in grave cases. Redness of the eyes, *tinnitus aurium*, and deafness were present in a certain proportion of cases, but differed in no obvious particulars from the same symptoms in typhoid fevers. There was great loss of muscular strength, from the beginning of the disease. In every case except the first, which was not carefully examined, there was an abundant cutaneous eruption, consisting of small spots, or *ecchymoses*, of a red, violet, or black colour, not elevated above the skin, and not disappearing on pressure. They were always found on the chest, often also on the abdomen, and in some cases they extended to the arms and legs. They commonly showed themselves about the fourth or fifth day, and gradually faded away between the tenth and the eighteenth. They were abundant and confluent in proportion to the gravity of the disease. The bodies of the sick exhaled a strong, offensive odour, resembling that of mice. In regard to the absence of appetite, to thirst, the state of the lips, tongue, and mouth, nothing special was observed, differing from what occurs in typhoid fever. Nausea was present at the commencement of the disease in all the cases. *Meteorism and abdominal pains were uniformly absent.* There was diarrhea in the beginning of the disease in only four cases. In all the others there was no apparent disturbance in the functions of the intestinal canal. The bowels were more inclined to constipation than to looseness. A distinct, well-marked, sibilant rhonchus was present in all the cases. Epistaxis occurred in eight cases. The temperature of the surface was uniformly elevated; the heat was dry and burning. In no instance was there gangrene of any part of the body. In the six autopsies which were performed, the intestinal lesions characteristic of typhoid fever were present. The elliptical plates were either thickened and elevated or they were the seats of ulcerations; and the mesenteric glands corresponding to them were enlarged. *The spleen was not increased in size in any of the cases:* in four it seemed somewhat softened.

Here we have the symptoms which every practitioner in Great Britain would describe under the name of typhus gravior, jail, or petechial fever; and originating under circumstances which give rise to such fevers in England; for we are informed that the quarter of the prison was originally intended to accommodate from 80 to 100 inmates, but at the time when the epidemic appeared its population amounted to 180. Yet we are told to regard it as something specifically distinct from typhus, because the plates of Peyer are, on examination, found diseased. The points of resemblance are multitudinous, but they avail nothing, because the one (supposed) point of discrepancy sitteth in the iliac region. Dr. Bartlett suggests, by way of surmounting the difficulty, that the causes of typhus and typhoid fever were commingled, and gave rise to a hybrid progeny, formed of the elements of two dissimilar diseases. M. Landouzy, with much prudence, says that we must await the result of ulterior observation before we shall be able to settle definitively the question regarding the identity of these several forms of fever. "In effect," he adds, "if in all future epidemics of the typhus of camps, of jails, of hospitals, &c. we find, as in that of Rheims, complete absence of disease of the spleen, and great differences between the symptoms and those of typhoid fever, we must confine ourselves to the conclusion that typhus and typhoid fever are analogous and not identical diseases. If, on the contrary, we find that in one epidemic diarrhea is absent, in another the petechial eruption, in another the rose-spots, and so on, we must conclude that these differences depend only on variations in the action of the epidemic cause, and that the disease is, in its nature and essence, identical with typhoid fever."

For the final adjustment of this question much will justly be expected from British writers; for we consider that a great deal of the confusion in which it is still involved has arisen from the vague and, we would add, too, declamatory character of some of the most popular British works on fever—works apparently more calculated to display the eloquence of their authors than the precise character of the fever of this country. The repair of the evil which we have done will be looked for at our hands. The world does not possess such a history of British fevers as Louis has furnished to those of France, or even as Dr. Bartlett has, in the present volume, given of those of the United States; and the decision of the question of identity and discrepancy has been attempted from unequal evidence—that from other parts of the world being complete and precise, that from Great Britain imperfect and vague. We beg, in concluding this branch of our subject, to express the belief that in proportion as it is duly investigated, the more will British be found to resemble continental fever; and, as furnishing some ground for this belief, we would remark, that all the cases which we have had examined during the current year (1843,) have displayed the triple lesion, affection of the plates of Peyer, that of the mesenteric glands, and enlargement of the spleen. These were all of them cases of young persons, or of persons, at least, under forty years of age. Among symptoms during the same period, we have observed diarrhea, meteorism, and pink-coloured, lenticular spots, not passing into the petechial state, to be attendants on a majority of the cases. Abdominal pains have been frequent, but not invariable; hemorrhage from the intestines has existed in one half of the cases, and in the fatal

cases has been profuse. We would remark, that in some parts of England hemorrhage from the intestines has, of late years, been a very frequent accompaniment of fever, and has often appeared to be, by its profuseness, a cause of death.

Dr. Bartlett is of opinion that the common continued fever of Armstrong and the slow nervous fever of Huxham are identical with typhoid fever. We cannot agree with him in this opinion, if by typhoid fever he means this disease in its ordinary intensity; for this were to identify a very fatal disease with one that is rarely so. We have long had reason to think that the disease described by Armstrong, and very generally by medical men in this country under the name of common continued fever, which we believe to be the same as the low nervous fever of Huxham, is a mild form of either variety of typhus. We have seen a member of a numerous family sicken of this common continued fever, and pass easily through it, whilst successive members of the same family have been attacked with typhus in its most aggravated form. Under similar circumstances we have seen what, from symptoms, would be called the typhoid variety arise in families, and spread from an original in appearance equally slight. It should ever be borne in mind, that all epidemics have a wide range of severity. Smallpox, scarlatina, measles, cholera may be an intense and dangerous disease, or a slight ailment; and typhus forms no exception to this law: but no little confusion has prevailed, and the same disease has passed under various names, because it has been forgotten.

Admitting the accuracy of the principle of Rousseau, that truth is in the things surveyed, and not in the mind which surveys them, and that all has not yet been done which is required to elicit the whole truth from the fevers of this country, we yet will venture to prognosticate that the ultimate issue of the investigation into their nature which is evidently now in progress, will show the truth of a remark of Dr. Southwood Smith, that "there is but one kind of idiopathic continued fever;" and that confusion has arisen from regarding varieties in degree and complications as distinct diseases.

The Third Part of the volume is dedicated to the diagnosis of bilious remittent fever from "the two continued fevers," on the one hand, and from yellow fever on the other. We think the first branch of this subject not devoid of interest in this country; for in certain parts of it remittent fever frequently prevails; whilst, in districts which it does not habitually visit, it appears occasionally in seasons of unusual warmth, and want of familiarity with its character causes it to be misunderstood by resident practitioners. Confusion and controversies have, within our remembrance, arisen from the confounding of bilious remittent with typhus.

The symptoms by which we are taught to discriminate these two diseases are indicated by Dr. Bartlett, as our own experience enables us to state, with great skill. As might be supposed, there are symptoms common to the two diseases, yet even in this case, there is a difference in the degree and form of these symptoms as they appear in the respective affections. Thus both have chills or rigors, but those attending remittent are more formal, and show a greater tendency to recurrence at intervals of twenty-four or forty-eight hours, the quotidian or tertian type, than is observed

in those accompanying typhus. The temperature in remittent varies more considerably than in typhus, rising and falling with the exacerbations and remissions of the disease, and, during these last, being either natural or below the healthy standard. The pulse in remittent is less rapid than in typhus. In eleven cases, in which its frequency was noticed by Dr. Gerhard, it exceeded a hundred in the minute in only two. Its condition, too, is more variable in the one disease than the other, being considerably accelerated during the exacerbations of remittent, and falling often to its natural standard in the interval. "One of the most striking and invariable differences between remittent and continued fever consists in the state of the mind. In the former disease it is rarely affected to any appreciable extent. Of eleven cases, observed by Dr. Gerhard, in 1834, at the Pennsylvania Hospital, all terminating in recovery, there was slight delirium in one only." The tongue in remittent is generally moist, and covered with a thick fur, of a whitish or yellowish or yellowish-white colour; and it begins to clean earlier than in continued fever. Nausea, vomiting, or both, are very constantly present in remittent fever; whilst diarrhea, so common in one form of typhus, is very rare. True tympanitic distension of the abdomen is seldom found in remittent; but pain, tenderness on pressure, with a feeling of weight and oppression, and fulness extending across the epigastrium from one hypochondriac region to the other are of frequent occurrence. The pain and soreness are more frequent in the left than in the right hypochondrium, a circumstance ascribed to the enlarged and congested state of the spleen.

There are symptoms common in typhus, which are never seen in remittent, as the rose-coloured spots so frequent in one form, and the dusky petechiæ so general in the other. In a few cases of remittent, there are sudamina mostly confined to the neighbourhood of the neck, but never any other cutaneous eruption.

The pathological appearances in this disease have been in general more vaguely described than those in typhus; but sixteen cases were examined by Drs. Gerhard and Stewardson in the Pennsylvania hospital with great precision; and the appearances have been accurately reported. The stomach in five of six of these cases displayed traces of previous inflammation. These consisted of mamelonation, and changes in the thickness, density and colour of the membrane variously combined in different cases. The mucous membrane both of the small and large intestines, was generally free from any considerable alteration; only such accidental lesions being found as are common after death, in most acute diseases. The elliptical plates were found uniformly healthy. In all the six cases, examined by Dr. Stewardson, in which the duodenum was particularly noticed, the mucous follicles or glands of Brunner, were very distinct and prominent. The liver was found of the colour of bronze, or a mixture of bronze and olive; in one case, it was found of a dull lead colour externally, internally bronzed with a reddish shade; in another between a brown and an olive, the latter predominating; and, finally, of a pale slightly greenish lead colour, with a tinge of brown in one instance. This peculiar alteration in the liver, Dr. Stewardson is disposed to consider the essential anatomical characteristic of remittent fever, although he admits that his cases have not been sufficiently numerous to determine the point definitively.

The spleen was constantly altered in remittents. It was softened and enlarged, and generally to a great degree. It was often found of dark blue or black colour, and of a pulpy consistence, the aspect of the organ being frequently very much that of a sac containing black, clotted, venous blood. This is precisely the condition of the spleen which we have ourselves constantly found in malignant intermittents, the *febres algidæ* of Torti and others. In remittent the mesenteric glands are free from disease.

After a recapitulation of the diagnostic marks between remittent and typhus or typhoid fever, Dr. Bartlett remarks:

"In some rare instances, where the disease is protracted, where the remissions are obscurely marked, where the tongue becomes dry and brown, where there is some delirium or stupor, and where other indications of the typhoid state show themselves, there may be some difficulty in forming a positive diagnosis. But even under these circumstances, the previous history of the case, and absence of many of the symptoms of typhoid and of typhus fever will prevent us from mistaking the disease for either of these latter affections." (p. 350.)

How well does our own matchless Sydenham indicate this difficulty and the scrutiny by which it is to be surmounted:

"Licet nonnunquam earum aliquo de Intermittentium naturâ reverâ participent, nullo charactere admodum visibili easdem prodente. Ut cum præmaturè, Julio mense v. gr., Intermittentes autumnales ingrediuntur atque increbescunt, non statim genuinum typum inducunt (quod Intermittentibus vernis quidem solemne est) sed *continuas Febres* ita per omnia imitantur, ut nisi *castigatissimo utrasque examine trutinareris*, ab invicem *discriminari* non possint; at retuso paulitim constitutionis impetu, et frænatâ vi, jam in typum regularem migrant; atque exeunte autumno, larvâ abjectâ, Intermittentes se esse, quales ab initio reapse fuerunt, palam fatentur, sive Quartanæ illæ fuerint, sive Tertianæ; quod si non diligenter animadverterimus, cum magno ægrorum nostrorum malo medicantes hallucinabimur, dum hujusmodi febres, quæ ex Intermittentium numero sunt, pro continuis veris et genuinis habeantur."*

Dr. Bartlett argues, we should say needlessly, in favour of the essential identity of remittent with intermittent and congestive fever, this last being the somewhat hypothetical name given in the United States to the *fièvres intermittentes pernicieuses* of Bailly and other French writers, and the *febres intermittentes malignæ* and *algidæ* of the Italian writers, those fevers of which the Pontine marshes furnish so abundant a supply to the hospital of Santo Spirito at Rome. His reasons are, the general correspondence of symptoms in the three forms of disease, and especially in the community to all of them of the remarkable phenomenon of periodicity, and, moreover, the accordance among them all as to pathological conditions. He quotes the following account of these conditions observed by Dr. Gerhard in the congestive fever of America, and points out its agreement with that given by Bailly in his elaborate essay on the malignant intermittents of Rome:

"In all these cases, the glands of Peyer, as well as the other intestinal follicles, were found perfectly healthy. The large intestine was occasionally, but not constantly diseased, whilst the stomach, and, to a still greater degree, the liver and spleen, were invariably found in a morbid condition. If the fever proved fatal in the course of the first fortnight, the liver and spleen were softened as well as enlarged; but if the disease assumed a more chronic form, the viscera were hardened as well as hypertrophied. The results of late examinations have confirmed those already obtained, and showed that the follicles of the small intestines are free

* Opera Universa, ed. 1726, p. 44.

from lesions, and that the anatomical character of the disease is to be looked for in the spleen, liver and stomach." (Bartlett, p. 352.)

The strongest argument, however, for their identity is that they are severally convertible, one into the other. A case of ordinary remittent fever is frequently changed in the natural progress of the disease, or by the effects of remedies, into a simple intermittent; or it may pass, as Dr. Bartlett remarks, in the other direction, by the supervention of the congestive elements in pathology, into a case of malignant or intermittent or remittent. How often have we ourselves seen the disease, which on the banks of the Gambia, or some other point in Africa, had existed as malignant or congestive remittent, yet had spared the life of the patient, converted in the course of his voyage to Europe into a simple intermittent promptly curable by preparations of cinchona. In the great influence exerted by such preparations over all the three forms of disease, Dr. Bartlett finds a strong corroboration of his arguments for their essential identity.

The essay on yellow fever opens with a disclaimer on obvious grounds of the necessity of establishing any diagnosis between this disease and typhus or typhoid fever. The discrepancies between the diseases are too manifest to require to be indicated. That the distance between this disease and remittent fever must require more attention is manifest, since in the days of Rush and Bancroft the opinion that yellow fever was merely a high and malignant degree of the common bilious remittent, was entertained not only by these writers, but was the general creed. One writer, however, of the period, Dr. W. Currie, who published a little work on the subject in Philadelphia, in 1798, expresses his conviction that they are distinct diseases in the following forcible and figurative language: "If we go down," says he, "to the meadows and marshes on the flats of the Delaware and Schuyskill, and look for yellow fever among the diseases which exhalations engender, it is not there. Imaginations and her whimsical daughter, theory, have circulated something in those places, which they have called its likeness; but the sallow imp of the marshes is the offspring of different parents, and differs essentially in its character from the jaundiced-eyed fiend, which extends its destructive sway by contagion."*

The decisive tone, however, of this passage did not set the question at rest, for when yellow fever appeared thirty years after (in 1828,) at Gibraltar, the question was, as it had previously been in the same place in other varieties, has "the jaundiced-eyed fiend" been imported from the West Indies, or is this merely an aggravation of our ordinary bilious remittent? The next coming winter extinguished the epidemic, but not the war of letters and pamphlets which it had engendered.

The following are the diagnostic marks selected by Dr. Bartlett:

"It does not appear that there is in yellow fever anything like the quotidian or tertian paroxysm and remission, which so generally characterize the several forms of remittent fever. Dr. Rufz, in speaking of the yellow fever of Martinique, in 1838, says, that there were no intermissions, and that the exacerbations were hardly perceptible. The yellow discoloration of the skin, in fatal cases of yellow fever, is more constant and more strongly marked than in those of remittent fever.

* Observations on the Causes and Cure of Remitting or Bilious Fevers, &c., Philadelphia, 1798, p. 43, and Bartlett, p. 357.

The headach would seem to be somewhat more intense, while acute local pains in various parts of the body are more common, and the general restlessness is more distressing in the former than in the latter disease. There is not often any considerable degree of delirium in either of the diseases, but stupor and coma are more frequent in the high grades, and in the congestive form of remittents, than they are in yellow fever. The early and almost invariable red suffusion of the eyes, constitutes a peculiar and very characteristic symptom of the latter disease. The great preservation of muscular strength, even up to the close of life, which is often so striking a phenomenon in yellow fever, does not appear to be common in remittent. Although the symptoms connected with the digestive apparatus are very constant and prominent in both diseases, they are far from presenting the same characters in each. To say nothing of the state of the tongue, which does not appear to be precisely the same in both fevers, there are very marked differences in relation to the vomiting. In remittent fever this is generally one of the earliest symptoms showing itself often on the first day of the disease. This is the case, also, not unfrequently in yellow fever, but in a larger proportion of instances, vomiting is not present till a later period, and in many fatal cases it does not appear until the last day or two of life. Besides this, there is the striking peculiarity of the matter vomited, at least in a large proportion of the fatal cases of yellow fever, consisting of the dark or black liquid which has already been described, and which is rarely witnessed in the course of remittent fever. Although the stools in the latter disease are frequently variously coloured, especially after the use of mercurial cathartics, I am not aware that they have often that peculiar black shade, which they present in many cases of yellow fever which are attended by the black vomit. Finally, pain and tenderness of the epigastrium are very uniformly present in both diseases, but the tension and fulness from one hypochondrium to the other, with the pain and soreness over the region of the spleen, which have been especially noticed by Dr. Stewardson, in remittent fever, seem to be less strongly marked, and have at least excited less attention in yellow fever." (pp. 371-3.)

Dr. Bartlett admits, and we agree with him, that there is not here any pathognomonic symptoms. The differences between the two diseases are in the degree only in which certain symptoms exist, excepting in the case of such as are not of *invariable* occurrence in yellow fever, as the red suffusion of the eyes, and black vomit. We are convinced, however, that if yellow fever were to make an irruption on any point where bilious remittent is the endemic disease, medical men would, after the occurrence of a case or two, perceive that they had something unwonted to deal with, and, even should they never have seen it before, would speedily discover the real title of their unwelcome guest. This is the more likely to be the case, since the first cases on the invasion of a new locality by yellow fever, or other epidemic diseases, are generally intense, and distinctly marked. The slighter cases which occur when the epidemic is on the decline, resemble more in character the ordinary endemic of the country; but, in such cases, preceding occurrences are a security against confusion. The respective duration of the diseases is a ground of distinction so broad and palpable, that it can scarcely fail to arrest the attention of the observer. The mean duration of remittent fever is shown by Dr. Bartlett to be a fortnight, whilst yellow fever, whether terminating favorably or the contrary, runs its course with great rapidity, the largest number of deaths taking place from the fifth to the seventh day inclusive; and the question of life or death in the disease being generally settled within the first week.

In his account of the pathological appearances, the author relies mainly

on the work of Louis, the publication of which was directly owing to his able countryman, Dr. Shattuck, junior, of Boston. This work, and the pathological facts it contains, having already received ample notice in our pages,* we deem it unnecessary to go over the same ground again. The characteristics of the disease set forth by Louis, however, having been deduced from one epidemic, that at Gibraltar, in 1828, it is interesting to remark how far they are confirmed or otherwise, by trans-atlantic observation.

It will be in the remembrance of our readers that in the cases observed by Louis at Gibraltar, the liver was found to be invariably the seat of a remarkable lesion, consisting in a change from its natural colour. The colour assumed is described by Louis as being sometimes that of fresh butter; sometimes that of straw; sometimes that of coffee and milk; sometimes is a yellow gum colour; or a mustard colour, or the colour of sole leather; or, finally, as an orange colour. This change of colour extended, in most cases, throughout the whole substance, although more marked and uniform in the left than the right lobe. With this discoloration of the organ there was more or less of dryness; it did not contain its usual quantity of blood.

It is interesting to notice the confirmation of these views of Louis, gathered by Dr. Bartlett from earlier or distant observers. Dr. Chisholm, in his account of the yellow fever which prevailed in the West Indies, in 1793, speaks of the liver as being "of a colour nearly approaching to buff, or a mixture of yellow and that of ashes." This same appearance has since been noticed by Dr. Rufz, of Martinique. Dr. Palloni, in an account of the yellow fever at Leghorn, in 1804, says, "the external surface of the stomach, liver, and intestines, had a livid yellow colour." In a case examined, in 1841, by Dr. Stewardson and our author, the colour of the liver, throughout its whole extent, was like that of powdered gamboge or yellow ochre. Dr. Ashbel Smith, a writer we formerly noticed,† found the organ, in three cases out of seven, of a very light drab colour externally and internally, and destitute of blood.

The following is the author's comparison of the anatomical lesions found in yellow and remittent fever respectively:

"The alterations in the brain are alike slight and unessential in both diseases. The state of the blood has not been ascertained with sufficient accuracy to render it of any service in diagnosis. There is no important difference in the changes of the mucous membrane of the stomach in the two fevers; and in both, at least in a very large majority of cases, there are indubitable evidences of preceding inflammation. The differences in the state of the mucous membrane of the intestines are not constant and considerable enough to require any notice here. The substance of the lungs, in a moderate proportion of cases of yellow fever, presents a peculiar lesion, which, so far as I know, has never been observed in remittent fever; and which is indeed an exceedingly rare occurrence in any other disease." [This lesion is described by Louis to consist either of black spots, of from two to five lines in diameter, or masses of the same colour more or less impermeable to air. Usually they could be easily broken down; in some cases they yielded, by pressure, the blood of which they were almost entirely composed.‡] "The contents of the stomach and intestines, in yellow fever, differ very constantly and strikingly

* See British and For. Med. Review, vol. X, pp. 494-508. † Ib. vol. XII, p. 433.

‡ Louis on Yellow Fever, translated by Shattuck, p. 64, and British and Foreign Med. Review, vol. X, p. 497.

from those of the same organs in remittent fever. The most invariable and important differences, however, are to be found in the condition of the liver and spleen. The liver in remittent fever is commonly softened, and of a bronze or olive-gray colour; in yellow fever it is destitute of its usual quantity of blood, and of a bright yellow colour. The contents of the gall-bladder, in the former disease, are usually abundant, fluid, and of a light colour; while in the latter they are scanty, dark-coloured, and consistent. The differences in the condition of the spleen, in the two diseases, are hardly less constant and striking. In half the subjects of yellow fever it is quite natural in all respects; in some it is slightly altered in volume or consistence; while, in remittent fever, it is found invariably very much enlarged or softened, or both." (pp. 385-86.)

Dr. Bartlett's opinion on the *vexata quæstio* of the contagion may be briefly stated. He considers, that in a pure atmosphere the disease is not transmissible from one individual to another; but that the unknown poison, wherever and in what way soever it may be generated, is capable of being carried in the holds of ships, and in close chests of clothing, from one place to another. Yellow fever, too, differs from remittent in the almost absolute immunity from a second attack which its occurrence confers on the individual. This immunity is supported by ample testimony.

The following is our author's concluding abstract of the points of difference between these two diseases,—yellow and remittent fever:

"They differ in their symptoms; their lesions; their causes; in the immunity from a second attack which is conferred by the occurrence of the former disease; in the preservative powers of *acclimatation*; and in duration. They are separate, individual diseases, each having its own characteristics; each, in most cases, easily distinguishable from the other; and each, in its several varieties, requiring its own mode of management." (p. 393.)

We have now given a view of the diagnostic portion of Dr. Bartlett's work. The distinction of the species and varieties of fever from each other being his principal object, he has not entered at any considerable length into the subject of treatment, except in the case of typhoid fever; and regarding this disease, the therapeutic methods adopted by some of the most eminent men in the United States and France, viz., Drs. Jackson and Nathan Smith in the former country, and MM. Chomel, Louis, Bouillaud, and De Larroque in the latter, are fully set forth. The plans of these distinguished parties are various enough. Those of the number, however, whose experience has been most extensive, Nathan Smith for example, and Chomel, think that mild cases cure themselves most surely without medication, all that is required being the administration of diluent drinks, a small quantity of farinaceous food, and the avoidance, as much as possible, of all causes of irritation. Bleeding is recommended, in the more inflammatory forms of the disease, by all the authorities quoted, excepting Dr. Jackson, whose chief reliance is on tartarized antimony, given first as an emetic, and afterwards in smaller but gradually increasing doses, according to the method of Odier, of Geneva. Bouillaud applies his plan of bleeding, *coup-sur-coup*, or (as Dr. Bartlett not inappropriately translates it) dash-upon-dash, to typhoid fever in common with all other acute diseases. On this practice our author remarks, that though Bouillaud has failed to establish the superiority of free and repeated bleeding in fever, yet he has shown that it is less dangerous than had been supposed,—in very plain English, he has killed fewer than might have been expected.

De Larroque trusts principally to purging, a proceeding which receives pretty strong approbation from Louis, in the second edition of his researches. Tonics and cordials are recommended under the circumstances which would naturally indicate their employment, by Chomel and Louis. The preparations of cinchona are the medicinal tonics employed, the former preferring the extract of bark, the latter sulphate of quinine. Mucilaginous enemata are recommended in the diarrhea, by Louis; and, should it in spite of these continue, he substitutes small enemata, containing a few drops of laudanum. Perforation of the intestine is treated, both by Louis and Chomel, according to the method of Drs. Graves and Stokes, with total abstinence and large doses of opium, though the doses recommended by Louis are smaller than those of the Dublin physicians.

The subject of treatment we consider a weighty one, especially in this country where the system of poly-pharmacy, we regret to say, prevails so much, perhaps in most diseases, certainly in fever. It seems to be overlooked that the tendency of fever in general, the typhoid variety not excepted, is to recovery, through a natural process, certainly a very exhausting one, but one which must be undergone; and it may be seriously questioned how far the perpetual administration of drugs—the *nimia medici diligentia*—does not injuriously disturb this process. Some of the most judicious and experienced of the writers quoted by Dr. Bartlett, Nathan Smith, for example, tells us that, in mild and simple cases, medicines, especially powerful ones, are injurious, and that the patient "gets along better" with diluent drinks, and a very small quantity of farinaceous food. Now our own experience tells us that not merely slight cases, but all cases "get along better" without medicines, excepting what may be required to empty the bowels at first, associated (perhaps), where the attack is a smart one, with one general bleeding; the diet mentioned by Nathan Smith, absolute repose in bed, a free supply of pure air, washing, and general cleanliness being rigidly observed. As a general rule, it is best to hold medicine, beyond the single purgative mentioned, in reserve, till the occasions for its employment occur.

What are these occasions? In the kind of fever now under consideration, they, in a great majority of instances, arise from the intestines, either in the form of diarrhea, hemorrhage, or perforation. Besides the mucilaginous drinks and enemata recommended by Louis for restraining the diarrhea, in this country at least, it will generally be found expedient to administer small doses of opium, combined with some astringent, such as chalk mixture. In hemorrhage from the intestines, which it has fallen to our lot to observe so frequently, and which we have not found so innocuous as it has appeared to Louis in France, we have resorted to strong astringents, sugar of lead, combined with opium, being the astringent which, in our hands, has proved the most effectual. In two cases in which the bleeding was so profuse as to threaten a fatal issue, all evacuations from the bowels were suspended for five days by means of the combination above mentioned. On the sixth day the bowels were moved by an enema of warm water; and this was continued daily till the intestines resumed their natural action. In these cases there was no recurrence of hemorrhage, and no subsequent untoward accident; convalescence after the lapse of some days took place without the employment of any other medicine. The diet which we have mentioned, and which we regard as the most important therapeutic agent in the disease,

should be persevered in during the diarrhea and hemorrhage, excepting when this last takes place, as it sometimes does, to a sudden and great extent, producing great exhaustion, when food of a more nutritious and stimulating quality is required for a period, such as beef-tea and wine. With regard to the other intestinal accident, perforation, we know of no plan likely to save the patient but that of Graves and Stokes.

The other occasion for resorting to means not merely dietetic arises when, in the course of the disease, the head becomes affected, and there is considerable delirium. When this occurs in an excited and inflammatory form, with a hot skin and full pulse, leeches to the temples or nape, and cold epithems to the shaved scalp should be resorted to. There is another form of delirium observable generally in a more advanced stage of the disease, with extreme jactitation and restlessness, a small thready pulse of great rapidity, temperature of the skin even lower than in health, and with a contraction of the pupils, forming what Dr. Graves has called the pin-hole pupil. In its restlessness, tremor, and, frequently, its loquacity, this form of delirium exceedingly resembles delirium tremens. We have seen it successfully combated by opium in small doses frequently repeated. Dr. Graves advises belladonna in the same state, and our experience of this narcotic enables us to speak favorably of its powers; but we have derived equal advantage from opium. Tonics, especially the preparations of cinchona, recommended on the high authority of Chomel and Louis in the typhoid fever of France, have not appeared beneficial in fever of the same form in this country.

Great caution is required against deception by a pseudo-convalescence, which occurs more frequently in this fever than in any other. We should ever be suspicious of a convalescence which takes place before the third week. The cooling regimen has been adhered to, the diarrhea has been allayed by opiates and mild astringents; the skin becomes cool, especially in the morning, when the medical man probably makes his visit; there is sleep at night; the tongue is cleaner, and there is even some appetite. The friends of the patient are deceived, and so too, sometimes, is the medical attendant. From an idea of combating debility, some chicken or other solid food is given. In a day or two there is a recurrence of diarrhea, or, it may be, of hemorrhage; the abdomen, which had fallen, again becomes tympanitic, and the general feverish state of the system again lights up. An abatement of fever had been mistaken for its cessation; the solid food has irritated the intestinal affection, which was still existing amid the calm, and the whole process of treatment must again be repeated. Within our own experience, many lives have been lost in this way. We should recommend that convalescence should be well ascertained and established for some days before a change is made from farinaceous food to an animal diet. The smaller sorts of white sea-fish form an excellent stepping-stone from one to the other; but even *they* should not be taken till convalescence is fully established.

We cannot close this notice of Dr. Bartlett's work without formally expressing our opinion of its great value. Possessed of an ample acquaintance with the literature of his subject, he has not neglected to study it in that best of books, the book of nature. His brethren in the United States have much reason to thank him for his clear and compendious view of a class of diseases in which they must feel so deep an interest.

Art. VI.

Der weiche Hinterkopf; ein Beitrag zur Physiologie und Pathologie der ersten Kindheit. Von Dr. C. L. Elsaesser.—*Stuttgart*, 1843. 8vo, pp. 230.

The Soft Occiput; a Contribution to the Physiology and Pathology of Early Childhood. By Dr. C. L. Elsaesser.—*Stuttgart*, 1843.

We have seldom met with a book for which its author can more fairly claim the merit of originality. The affection of which it treats, though it would appear to be neither unimportant nor infrequent, has not hitherto been noticed by medical writers. Dr. Elsässer's attention was first called to it accidentally five years ago; he has since studied the disease carefully, and the results of his investigations are embodied in the work before us. This work contains much that is both new and valuable, though we cannot help thinking that the author has occasionally ridden his hobby rather too hard. Be that as it may, however, we feel that we have not yet had opportunity sufficient for thoroughly testing the accuracy of all his statements, and shall therefore content ourselves with laying a simple abstract of them before our readers.

The disease described by Dr. Elsässer consists in a softening of the cranial bones, and consequent thinning of those parts of the skull, such as the occiput, which are much exposed to pressure. Hence its names of "the soft occiput," from its most striking symptom, or of *craniotabes*, expressive of the general disease of the cranial bones. Dr. Elsässer believes the affection to be a variety of rickets; that form namely which rickets assumes in the infant, while in after years it involves chiefly the bones of the trunk. So far too is it from being a rare disease, that in five years forty cases have come under the author's notice, and the consequences resulting from it are so serious that fourteen of these forty patients died.

Before entering on a description of this morbid state of the infantile skull, Dr. Elsässer makes some very interesting observations on the structure of the cranium in early life, and on its mode of growth, and points out the objects that are attained by its peculiarities in both these respects.

The new-born man occupies a lower position than the young of other mammals, with reference to the development and activity of his animal functions. He is unable to support his head, but lies in a horizontal posture, his head almost always resting on the occiput. Associated with this low state of activity of the animal functions is the comparatively undeveloped condition of the brain, and, as a necessary sequence, the imperfect ossification of its bony case. It is true indeed that the brain in the human fœtus bears a greater proportion to the weight of the body, than it does in the fœtus of other animals; but if the size of the human brain at birth be compared with that which it attains during the first few years of life, we cannot but regard its development as very incomplete. No organ except the spleen increases in size so rapidly during early life; for in the second year the weight of the brain is nearly double that which it was at birth; while according to Sömmering and the Wenzels, its growth ceases altogether in the seventh year. Hence it was necessary

that the cranium should admit of the free growth of the brain; and accordingly we find this great end answered by the peculiar form of the fœtal skull, by its fontanelles and its unossified sutures.

In animals who are accustomed from birth to bear the weight of their head, and in whom it is consequently exposed to blows and concussions, any such softness of the bony capsule as exists in the human subject, would have been inconvenient and even dangerous; therefore in them the sutures are firmly closed, and the fontanelles ossified. In some of them, however, a provision exists for the growth of the skull in the overlapping of the temporal, occipital, and parietal bones where they are in contact with each other; thus, in the young of the pig, nearly a third of the concha of the occipital bone overlaps the parietal bones. This arrangement is usually found in the human subject only at that part where the squamous portion of the temporal overlaps the parietal bone; though in a few instances a slight overlapping of the sutures is likewise present. In all cases, however, the unossified fontanelles and unclosed sutures serve the double purpose of permitting the mechanical expansion of the skull by the enlargement of the brain, and of rendering the growth of the cranial bones themselves possible. Among these provisions for the growth of the brain and enlargement of the skull a peculiar importance is to be attached to the great fontanelle, which, according to Dr. Elsässer, progressively increases in size during the first nine months of infantile life. He examined its condition in seventy-five children; fifty of whom were under fourteen months old, and in all of them it was still open; twenty-four were between fifteen months and two years, and in ten of them it was still open, and in fourteen it was closed. In the only child whose age exceeded two years, the anterior fontanelle was likewise closed.

"The dimensions of the anterior fontanelle at successive periods of three months were as follows:

Trimensual periods.	Number of children.	Average diameter of the Fontanelle.
From 1st to 3d month	10	9·60 lines.
4th — 6th	15	11·93
7th — 9th	7	13·90
10th — 12th	13	11·88
1st — 12th During which the Fontanelle is always open.	45	11·60
From 13th to 15th month	9	7·78

"Of these 9 children the fontanelle was closed in 3; in 1 it was five lines, in the others from ten to fifteen lines in diameter.

From 16th to 18th month ... 8

"Of these 8 children the fontanelle was closed in 4; in the rest it was two, three, nine, and ten lines in diameter.

From 19th to 21st month ... 5

"In 2 it was closed; in the others five, twelve, and twelve lines in diameter.

From 22d to 24th month ... 7

"In 5 it was closed; in the others nine and fifteen lines in diameter." (p. 10.)

"On a comparison of the size of the anterior fontanelle in children of about the same age—that is to say, belonging to the same *trimester*—a greater discrepancy is observed the older that the children are. Thus it varied—

"In the 1st Trimester from	8	to	12 lines.	
2d	6		16	
3d	5		17	
4th	5		19	
5th	0		15	etc." (p. 12.)

If nature, then, do so carefully maintain a membranous interspace between the bones of the skull, we may fairly assume that some good end is thereby answered. The continuance of a longitudinal fissure, such as the sagittal suture, would not have answered this end; for it would have been liable to be diminished by pressure, while it would also have been gradually obliterated by the growth of the bones. From the very form of the fontanelle, however, this result, as Dr. Elsässer explains at pp. 13-14, does not ensue, while its approximation to a circular shape has the advantage of affording a large space in a small room. The uses of the anterior fontanelle are not merely of a negative kind, but it serves as a sort of safety-valve, bulging outwards when the brain is congested, sinking inwards when its circulating fluid is diminished; thus preventing the serious results either of congestion or anemia.

With reference to the varying size of the anterior fontanelle in children of the same age, it is fair to conclude that an unusually small fontanelle depends on the great activity of the ossification of the cranial bones; and a remarkably large fontanelle on its preternatural slowness, a condition usually associated with congenital weakness of the constitution. With this unusually wide fontanelle a preternaturally large head is generally combined, for the tardy ossification of the bones favors their superficial growth.

But, although the anterior fontanelle is yielding, yet the bones of the skull in early infancy are in general firm and resistent, and cannot be indented by moderate pressure, except slightly in the immediate neighbourhood of the anterior fontanelle. Dr. Elsässer found, however, that in seventeen of the seventy-five children whose heads he examined, the cranial bones were in some parts pliable, and admitted of being depressed by the finger. Not one of these children, however, was under three months old; a fact which sufficiently proves that this condition cannot be regarded as congenital. These yielding parts of bone, too, were all, without exception, at the occiput; and though the children in whom they existed were tolerably healthy, yet Dr. Elsässer infers that this condition was an incipient stage of craniotabes.

The author next calls attention to the changes which the interior of the skull undergoes in the course of years. From being comparatively smooth, it comes to present a series of depressions, worn, as he believes, by the continued pressure of the brain. In support of this theory of their origin, he adduces the fact that these indentations are found especially in the occipital bone, while it is that very part which bears the chief pressure of the brain; the child lying almost constantly in the horizontal posture for many months, and afterwards spending a great part of its time in that position.

The second chapter treats of the morbid anatomy of this affection. The skull of children affected with craniotabes is soft, easily cut, its bones have lost their compact structure, have become softer, more vascular,

more pliable, and similar to the spongy bones. They have lost their smooth surface and fibrous texture, and have become rough and porous; a state produced by the diminution of their earthy constituents, and a disintegration of their tissue. The canaliculi of the bones become dilated, more cellular, and communicate freely with other canaliculi; changes precisely similar to those which Miescher describes as being produced by rhachitis in other bones. Besides this condition of the cranial bones in general, various spots will be found at the posterior part of the skull, where the osseous substance is extremely attenuated, or even totally wanting, and these spots will be found to correspond to some of the gyri of the brain. These attenuated or perforated spots are found mostly in the occipital or parietal bones, and in the immediate neighbourhood of the lambdoid suture. The bones in that situation are yielding and elastic, like stiff paper or tinsel, and, on laying the child with its head upon a hard surface, they will be depressed some lines. When there is actual loss of bony substance, these holes can be felt distinctly in the midst of the stiff and elastic cranial wall. Occasionally these holes are very numerous; Dr. Elsässer once counted thirty in a single skull.

Minute details of the history of thirty-seven cases follow, and on these Dr. Elsässer grounds his description of the general features of the disease. The children in whom it exists are mostly of a weakly constitution, and distinguished by a disposition to tardy development. They may, notwithstanding, have tolerably good health, and in their second or third year may grow rapidly, and become as robust as other children. They are further characterized by a general softness of their bony structures, they are usually restless, unquiet, often moaning, subject to disturbance of their digestive organs, and more liable than others to convulsive attacks. Sometimes, however, it comes on in children previously strong, healthy, and well nourished, and an unusual development of fat has seemed, in some instances, rather to predispose to its occurrence. In either case, some accidental cause generally gives rise to the disease; it may follow a blow, or may succeed to an attack of catarrh, or to disturbance of the digestive organs. The symptoms which accompany it arise from two sources,—the general dyscrasia, and the local lesion, but the line between the two cannot be drawn with any great accuracy.

The symptoms of craniotabes, for the most part, make their appearance about the third or fourth month; when the children begin to sleep ill, or their former restlessness is notably increased. They sleep with their eyes half open, roll their head about much, and bore with it in the pillow. At the same time, too, they perspire much, and this perspiration is especially profuse about the head. During the day-time they are surprisingly cheerful, and seem as though nothing ailed them, unless they fall asleep, when the state of disquiet again returns, and they become extremely impatient and fretful if laid with the head upon a hard pillow. Sometimes the head appears tender, so that the occiput cannot be touched without pain, while the children are fond of lying on the belly, and will often rub their face against the pillow. The whole nervous system seems highly excitable, and the slightest cause suffices to alarm the child.

The growth of hair on the head of children thus affected is naturally scanty, and after the disease has existed for some time the occiput becomes

nearly bald, from being incessantly rubbed against the pillow. There is more or less disturbance of the digestive functions, and catarrh and diarrhea are frequent, though not severe. Sometimes, though not always, rhachitic deformity of the chest supervenes, and the patient then suffers from frequent cough. None of these phenomena, however, impart to the disease its grave, and often fatal character. This depends on the convulsive seizures, which occurred in fourteen out of twenty-nine cases, and, in ten of these, proved fatal. These attacks were either simple convulsions, or else of a tetanic character, and, in some instances, both of these were combined. They came on once, or oftener, in the course of the day, but sometimes an interval of days, or even weeks, would elapse between their recurrence. In the intervals the child was comparatively healthy; that is to say, that no other than the general symptoms of craniotabes were present. Frequently death took place after several returns of the attacks, and, when this was the case, there was seldom a complete intermission between the seizures, but a febrile condition, with symptoms of persistent cerebral irritation, continued for some days before the fatal event.

"In those fatal cases, in which post-mortem examinations were made, a marked state of congestion, or inflammation of the membranes of the brain, or spinal cord, was always discovered.

"These anatomical alterations of the nervous centres plainly indicated the cause of the attacks, and led likewise to the inference, from analogy, that, in the earlier stages of the disease, when intervals of health occurred between the attacks, though no permanent condition of congestion or inflammation existed, still a temporary congestion of the brain must have occurred, and given rise to the convulsions."

In those cases in which the convulsions partook of a tetanic character, either the breath was suspended, owing to the spasm extending to the respiratory apparatus, or respiration went on with more or less obvious disturbance. This affection of the respiratory movements occurred in four children, and in them, as well as in those instances where the convulsions presented a simply tetanic character, the attacks came on suddenly, and without any preliminary symptoms.

"........The muscles of the back, of the eyes, face, and limbs, became firmly contracted, and, at the same time, respiration was suspended. The whole body became cold as a corpse, the face grew livid, and was covered with a cold sweat. Sometimes, before the power of respiration returned, general relaxation of the muscles took place, so that the child's head and arms sank powerless, and conveyed to bystanders still more forcibly the impression that life had fled. In some instances, indeed, paralytic relaxation of the muscles seemed to coexist with the suspended respiration from the very beginning of the attack, or at least the previous contraction of the muscles was of such brief duration as to be scarcely observable. Occasionally, a sudden screech announced the commencement of the attack; hasty, laborious expirations, with proportionably long inspirations, betokened its close. When respiration was once more established, the child would sink down exhausted, and usually fell asleep." (p. 137.)

The age at which craniotabes usually commences, its modes of termination, its dangers, and its influence on infantile mortality, are next investigated. Dr. Elsässer concludes that the disease may commence in the first three months of infantile life, and perhaps soon after birth; but

that it usually comes on in the course of the second three months of infancy. It should be observed, however, that he had the opportunity of determining the date of its commencement only in three instances, in which he saw the children before the disease began, and, at a subsequent period, found them presenting marks of its existence. In those instances in which recovery takes place, the skull usually regains its natural firmness within the first year of life, or at least between the eighth and thirteenth month. Recovery is announced by the gradual remission of the symptoms, and return of the natural condition of the skull.

With reference to the mortality produced by this disease, it appears that of twenty-nine children affected by it, fifteen recovered, fourteen died; of whom ten died in convulsions. In round numbers, then, it may be stated, that craniotabes proves fatal to half of those affected by it; a result which sufficiently proves the disease to be of serious importance, as well as of frequent occurrence.

The essential nature of the disease is the subject of the next chapter. Dr. Elsässer calls attention to the fact, that no condition of the cranial bones, such as he here describes, exists at any period of fœtal life, or is found as a result of simple arrest of development. Some writers, indeed, who appear to have met with cases of this affection, attribute them to that cause; but at no period of development do we find patches of membrane surrounded by bone, though the sutures be never so widely open; nor should it be forgotten that the parietal bone in which several of these membranous spots are often found is formed from a single point of ossification. The attenuation of the skull is the simple result of pressure on the softened bone, as is shown by the holes existing only about the occiput, and corresponding exactly to the convolutions of the brain. That portion of the skull, too, is always affected on which the head rests, and which, consequently, is subjected to pressure from the brain within, and the pillow on which the infant reposes without. Not only the mere weight of the brain and its rapid growth concur to produce the attenuation of the skull, but its rhythmical movements also contribute to the same effect. These, then, are its proximate causes; its remote cause is to be found in the relatively small degree of development of the animal functions and of their organ, the brain, in the young of the human subject.

What, however, occasions that morbid softness of the bones of the skull, which allows of their being thus attenuated by pressure? The author, as we have already mentioned, considers it to be of rhachitic origin; in many instances, indeed, signs of rickets existed in different parts of the body. Writers, indeed, have usually regarded infantile life as free from the attacks of rickets; and have dated its commencement from the first, second, or third year of childhood. But Dr. Elsässar observes:

"According to the result of our observations, infancy enjoys no immunity from this disease; it is indeed of by no means rare occurrence, and, at any rate, is much more frequently met with than was commonly supposed. It manifests itself in infancy chiefly in softening of the cranial bones, and consequent thinning of the occiput. Craniotabes is the form which rhachitis assumes in infancy.

"This form of rickets having hitherto been overlooked, it necessarily followed that the real commencement of the rhachitic *dyscrasia* was not apprehended. It

was erroneously supposed that the disease did not begin until the end of the first year of life, or even later; its commencement and its course were described only as they affected the rest of the skeleton, while the skull was either unnoticed, or was assumed to possess a kind of immunity from the disease.

"According to our observations, however, rhachitis is often almost entirely limited to the bones of the skull They may, too, recover from this diseased condition without any deformity of the rest of the skeleton having ever been produced, and this whole course of rickets may be run within the first year of life.

"Various attempts have been made to determine the chronological order in which the successive effects of rickets on the skeleton are produced. The fact is unquestionable, that some parts of the skeleton may present a high degree of morbid softening and deformity, while other parts are not affected in any appreciable measure. This is especially true of rickets affecting the skull.

"Another fact is, that skeletons softened by rickets may have regained in some parts their natural firmness, while other parts are still soft and deformed, or are just becoming so. Thus, for instance, it is not unusual for craniotabes to have disappeared when the bones of the thorax, spine, or extremities are beginning to be curved and morbidly enlarged. Any one who, in such a case, is ignorant of the existence of the former affection would date the commencement of the whole disease from the appearance of the latter symptoms.

"The erratic character of rickets is a fact beyond dispute. The rule according to which this wandering of the disease takes place is intimately connected with the phases of development of the principal parts of the body.

"It usually establishes itself in whichever part of the body the vegetative and functional endowments are in the most active and energetic state of development. In this respect, the head, thorax, and extremities may be distinguished. With the changes in the development of the viscera, there takes place a corresponding change in the development of the bones which inclose them." (pp. 152-3.)

We cannot follow Dr. Elsässer through the various illustrations by which he supports this theory, and shows how the head, chest, and locomotive organs become, in succession, the seat of rickets. He regards the convulsions which were present in nearly half the cases as a secondary occurrence, induced by the irritation and excitement of the imperfectly shielded brain. That condition of the skull which leaves the brain thus incompletely defended, he believes himself justified in regarding as a frequent—perhaps the most frequent—cause of convulsions in infancy, and especially of those in which the attacks are interrupted by intervals in which the patient is free from them. From these observations he passes to a very lengthened comment on laryngismus stridulus, the drift of which is to establish that the affection depends on primary disorder of the brain rather than of the respiratory nerves; and that this cerebral disorder results, in the greater number of cases, from craniotabes. In support of this opinion he appeals to cases of laryngismus recorded by different writers, in which either rickets or some morbid condition of the cranial bones is stated to have existed.

The predisposing cause of this disease is to be sought in a congenital weakness of the constitution, with which is usually associated a tardy development of the whole body, and especially of the osseous system. The disease often runs in families, and very fat children seem peculiarly liable to it; and in some in whom it occurred this abundance of fat was not associated with laxity of fibre or any indication of other than robust health. It is often developed after some severe acute or chronic disease, especially catarrh or other affections of the respiratory organs; next to

which in frequency derangements of the bowels seem to give rise to its occurrence. Impure air, damp, and want of cleanliness are also powerful exciting causes. The disease, too, is more frequent in winter than in summer—a difference which Dr. Elsässer attributes not to the cold of that season, but to the fact that the rooms of the poor are then more strictly closed than in summer, by which means pure air is almost entirely excluded, while the stoves are so heated as constantly to maintain an unnaturally high temperature.

The treatment of the disease may be summed up briefly: Judicious dietetic management is of quite as much importance as therapeutical measures; but the rules by which it is to be regulated do not differ from those that would apply to delicate children in general, except in one particular. This point regards the pillow for the head, which should be soft, elastic, cool, and so formed as not to allow the head to sink too deep into it. A horse-hair pillow combines these advantages, but they are still more certainly attained by cutting in it a pear-shaped hole, with its apex directed downwards, and a diameter of two and half to three inches at its broadest part, in which the occiput is received without the soft bone resting upon any surface beneath.

The medicinal treatment of the disease consists in the administration of preparations of iron, which appeared to answer better than the oleum jecoris aselli, or than quinine or other tonics. The carbonate was the form in which it was most frequently used by Dr. Elsässer. The constipation which was prone to occur was best removed by small doses of aloes, besides which the regular use of *Eichelkaffee*,* in children who were no longer at the breast, seemed often to obviate that occurrence. With these internal remedies the employment of tonic baths was combined. Baths containing decoctions of aromatic herbs or an admixture of iron, were used with benefit; but none appeared to do so much good as tan-baths. These were prepared by boiling two or three handfuls of ground oak-bark, such as is used by tanners, in two or three quarts of water, for half an hour, and then adding the decoction to the bath. These baths should not be too warm, and their temperature should be gradually reduced till they are as cool as the child can bear without shivering. Cold sponging may be advantageously combined with the use of the bath.

The treatment of the different complications does not present anything of importance, beyond the fact that the above-mentioned plan is usually to be persevered in in spite of them. The convulsions are to be treated by leeches, mercurials, and counter-irritants.

We have now presented our readers with an outline of this interesting monograph. We have no liking for hasty criticism, and therefore offer no comment on the writer's statements. They seem, however, to be made in all good faith, and as the result of careful investigation; and we trust that the subject will engage the attention of others who are placed in a position for observing the diseases of children.

* The *Eichelkaffee*, or acorn coffee, which is a favorite remedy in Germany for various cachectic affections of children, is prepared by mixing half a tablespoonful or more of roasted acorns in powder with half that quantity of coffee, and preparing with it a beverage which may be taken twice a day, and when flavoured with milk and sugar, like ordinary coffee, has not by any means a disagreeable taste.

ART. VII.

1. *Die Selbständigkeit des sympathischen Nervensystem durch anatomische Untersuchungen nachgewiesen.* Von F. H. BIDDER und A. W. VOLKMANN, Professoren in Dorpat. Nebst drei Kupfertafeln.—*Leipzig*, 1842. 4to, pp. 88.

The Independence of the Sympathetic Nervous System, demonstrated by Anatomical Researches. By F. H. BIDDER and A. W. VOLKMANN, Professors at Dorpat. With Three copperplates.—*Leipsic*, 1842.

2. *Untersuchungen über den Bau den Nervensystems.* Von Dr. B. STILLING und Dr. J. WALLACH. Erstes Heft, enthaltend *Untersuchungen über die Textur des Rückenmarks.* Mit Abbildungen.—*Leipzig*, 1842. 4to, pp. 52. Zweites Heft, enthaltend *Untersuchungen über die Textur und Function der Medulla Oblongata.* Mit 7 Tafeln Abbildungen.—*Erlangen*, 1843. 4to, pp. 72.

Researches into the Structure of the Nervous System. By Dr. B. STILLING und Dr. J. WALLACH. Part I—*Researches into the Texture of the Spinal Cord.* 1842. Two Plates. Part II—*Researches into the Structure and Function of the Medulla Oblongata.* 1843. 7 Plates.

3. *Traités et Découvertes sur la Physiologie de la Möelle Epinière.* Par J. VAN DEEN, Docteur en Médecine, &c. &c. *Traduits du Hollandais, augmentés de nouvelles Recherches, &c.*—*Leide*, 1841. 8vo, pp. 224

Treatises and Discoveries on the Physiology of the Spinal Cord. By J. VAN DEEN, M.D. &c. *Translated from the Dutch, &c.*—*Leyden*, 1841.

4. *Untersuchungen über die Functionen des Rückenmarks und der Nerven.* Von Dr. B. STILLING, pract. Artze und Wundartze zu Cassel. Mit Abbildungen.—*Leipzig*, 1842. 8vo, pp. 316.

Inquiries into the Functions of the Spinal Cord and Nerves. By Dr. B. STILLING, Physician and Surgeon at Cassel.—*Leipsic*, 1842.

5. *Untersuchungen über das Nervensystem.* Von Dr. JULIUS BUDGE. Erstes Heft, 1841. 8vo, pp. 188. Zweites Heft, 1842. 8vo, pp. 238.

Inquiries respecting the Nervous System. By Dr. J. BUDGE. Two Parts.—*Frankfort*, 1841-2.

6. *Die Physiologie des Rückenmarks mit Berüchsichtigung seiner pathologischen Zustände für pratische Aertze.* Von BENEDICT SCHULTZ, Doctor der Medicin.—*Wien*, 1842. 12mo, pp. 70.

The Physiology of the Spinal Cord, with reference to its Pathological States, &c. By Dr. B. SCHULTZ.—*Vienna*, 1842.

7. *Mikroskopiske Undersögelser af Nervesystemet.* Ved ADOLPH HANNOVER, Lic. Med.—*Kjöbenhavn*, 1842. 4to, pp. 112.

Microscopical Investigations of the Nervous System. By Dr. A. HANNOVER.—*Copenhagen*, 1842. With Seven Plates.

8. *Untersuchungen über die Physiologie der Nervenfaser.* Von Dr. GEORG HERMANN MEYER, Privatdozenten zu Tubingen, &c.—*Tubingen*, 1843. 8vo, pp. 316.

Inquiries into the Physiology of Nervous Fibrils. By Dr. G. H. MEYER, Private Teacher at the University of Tubingen.—*Tubingen.*

THE anatomy and physiology of the nervous system constitute a continually widening field of research to the physician, and it is matter for

satisfaction that the cultivators become more numerous as its boundaries enlarge. It would be scarcely possible to estimate this branch of medical science too highly. Practical medicine in all its branches will be efficient in proportion as our neurological knowledge becomes more accurate and extended, but especially in those departments which comprise the diseases of the brain and nerves. General hygiene will draw largely also upon neurology for first principles; the laws regarding insane men must be based upon it; and mental philosophy or metaphysics must henceforth be cultivated as a portion of the physiology of the nervous system. These remarks will suffice as an apology, if one be needed, for presenting so long a list of works on the subject to the notice of our readers.

I. ELEMENTARY ANATOMY OF THE SYMPATHETIC SYSTEM. It is not yet decided by anatomists and physiologists whether the sympathetic be an independent system of nerves, or dependent on the cerebro-spinal system. In our review of Valentin's 'Four Books on the Functions of the Cerebral Nerves and the Sympathetic,' we expressed ourselves as coinciding in opinion rather with Müller and Remak, who maintain the former, than with Valentin, who holds to the latter.* The anatomical researches of Professors Bidder and Volkmann were instituted with the express purpose of deciding the question; with what result is sufficiently indicated by the title of their publication.

The two anatomists entered on their undertaking with a full knowledge of the points to be ascertained, and with a thorough conviction of the difficulties to be overcome. They knew that unwearied industry, unflinching perseverance, and the utmost caution against errors, were necessary to a successful result; and, in accordance with these views, they have, at least in one animal (the frog), traced the whole sympathetic, twig by twig, fibril by fibril, and had so accustomed their eyes to these microscopic researches, that when a good preparation of the nervous system of a frog was submitted to their inspection, they could say, at a glance, whether it was derived from the sympathetic or cerebro-spinal system; whether from a motor or sensitive twig; or whether from the root or trunk of a nerve: nay, they could even decide from this simple inspection, if the preparation were a portion of a spinal nerve, whether it was taken from above or below the point of junction of the nerve with the sympathetic branch, or far from it or near it; and if this point of junction itself were placed under the microscope, they could say whether it belonged to the three upper, the three middle, or the three lower spinal nerves. Having so thoroughly qualified themselves for microscopic researches, they claim the confidence of their readers as to the accuracy of the researches themselves.

The first division of the essay is a view of the elementary composition of the sympathetic and cerebro-spinal system. The distinctive characteristics of the sympathetic ganglia were too striking to remain unnoticed by anatomists; as regards these they were agreed; but the relation of these ganglia to each other, to the nervous fibrils issuing from them, and to the cerebro-spinal system, gave rise to considerable differences of opinion. On the one hand, it was thought that the ganglia were like

* British and Foreign Medical Review, vol. XI, pp. 299-300.

little brains, and originated from fibrils; on the other that they were plexuses only, and that the fibrils entering them passed through them unchanged. Ehrenberg considered the microscopic characteristics of a sympathetic fibril to consist in a varicose structure, resembling strung pearls, and in a definite thickness of the primitive fibrils. This was to a certain extent a microscopic illusion; he discovered, however, the ganglionic globules. Treviranus did not confirm these researches, except that he found the primitive fibrils of the sympathetic were three or four times smaller than those of the cerebro-spinal nerves. He found, too, that the cylinder of which they were composed contained a softer matter than that of the cerebro-spinal nerves, and that the space observed between the contained matter and the outer membrane of the cylinder of the latter was wanting in the former. According to Valentin's researches, the ganglionic globules discovered by Ehrenberg are peculiar to the fibrils of the sympathetic ganglia and nerves, giving them their distinctive colour by being interspersed among them—the fibrils themselves being white. Valentin maintained also that there was no real difference between the two great classes of nerves.

The views of Remak are already, doubtless, well known to all of our physiological readers through Dr. Baly's translation of Müller's Physiology and our own analysis of them, vol. VII. Remak terms the sympathetic the system of organic nerves, and adopts Valentin's views respecting the presence of globules or small oval knots, which closely resemble the ganglionic globules, but they are *on* the fibrils, not *among* them. The colour also of the fibrils is not dependent upon these bodies, but upon the peculiar organic structure of the fibrils themselves. Hence Remak added the term gray to organic as a synonyme, and consequently described the sympathetic as the gray or organic nerves. Müller and Schwann adopted Remak's views, Valentin, on the contrary, stoutly opposed them. He maintained that the elementary structures described by Remak were only the membrane of the ganglionic globules, prolonged over the efferent fibrils, and that their softness and gray colour were caused by these membranes. The knots on the fibrils described by Remak are, according to Valentin, partly dependent on the remains of cells of the fibril-like epithelium, and partly an optical delusion. He insisted, too, that Remak had mistaken fibrils for cellular tissue. Henlè then entered the controversy in favour of Remak, acknowledging, however, that the latter had confounded various structures as epithelium, vessels, &c., with nervous fibrils. At a later period, Henlè repeated this acknowledgment more distinctly. Purkinje and Rosensthal next joined Valentin against Remak, but maintained that what Valentin called fibril-like beaded epithelium, ought properly to be termed the *formatio granulosa*, an elementary formation, having no special relation to nervous structures; and that the globules of which it consists by no means indicated the presence of organic fibrils. They insisted, however, against Valentin, that the latter really exist, and are characterized by a yellowish appearance, by their less size, their softness, and the want of double walls, and by their smoothness and but slightly granular surface. One of the inferences from their researches was that the cerebro-spinal nerves of the fœtus were not different from the permanent sympathetic nerves of the adult, and

that the latter should be considered as a lower grade of development of the former. Pappenheim followed Purkinje and Rosenthal in the controversy, with whom he agreed as to the nature of the supposed ganglionic globules of Remak, and as to the similarity of the two classes of nerves in the fetal stage of development. He allowed also the existence of organic fibrils, and with Purkinje stated that they might be known from cerebro-spinal fibrils by their magnitude, contexture, and behaviour to acetic acid; and he agreed with Valentin as to the relation between the ganglionic fibrils and the nervous twigs. Pappenheim also found that a cerebro-spinal nerve never contained organic fibrils, unless when these were derived from the sympathetic nerves or ganglia, and that the branches connecting the latter with the spinal cord might be traced into the roots of the spinal nerve. Valentin, however, was not induced to change his own opinions, but maintained them the more strongly; and so our two professors step in to decide the important questions raised during the controversy, and (if that were possible) to end the strife. We shall now proceed to present our readers with an analysis of the results of their researches.

As regards the colour and softness of the sympathetic nerve. According to Bidder and Volkmann, the colour is neither dependent upon interspersed globules, nor upon the sheaths of the fibril, but is *sui generis*, and dependent upon the fibrils themselves. The nerves are softer than those of the cerebro-spinal system, because the tendinous fibres in the sheath of the latter are wanting. As regards the elementary structure, our authors agree with Valentin, Henlè, Purkinje, Rosenthal, and Pappenheim in denying the existence of Remak's organic fibrils; they are opposed to all analogy; they are only found in the nerves of the two lower classes of vertebrata, and are wanting altogether in the sympathetic nerves of the warm-blooded; they are observed as inclosing blood-vessels around which numerous twigs are distributed; they are exactly like certain described forms of cellular tissue, particularly of embryonic life, and, in short, they *are* cellular tissue. On the other hand, our authors show that the organic fibrils described by Purkinje, Rosenthal, and Pappenheim are truly described, and are not identical with those described by Remak, and that the researches directed by Valentin against Remak's views are not applicable to those of the last-mentioned microscopic anatomists. Valentin is in error respecting the true nature of the sympathetic fibrils as much as Remak. According to Bidder and Volkmann, the fibrils of the sympathetic do not exhibit under the microscope the two dark textures peculiar to those of the cerebro-spinal system. They are, indeed, included within distinct boundary-lines (grenzlinien), but these are much less dark and broad. In this respect they have a remarkable resemblance to the cerebro-spinal fibrils in the embryo. In embryo calves, from two to three inches long, Bidder and Volkmann could detect no difference between them, even with the best microscope. Towards the end of the embryonic period, the sympathetic is little altered, but the cerebro-spinal fibrils are very similar to those of the sympathetic in the adult. Bidder and Volkmann infer from observations of this kind, that the difference between the two classes of nerves is not so great as to demand their appropriation to distinct tissues.

According to observers generally, the primitive sympathetic fibril appears not as a hollow but as a solid cylinder, without the double membranous tube peculiar to the cerebro-spinal nerves. This view is confirmed by our authors. There are cases, however, in which these distinctive marks fail. In the perfectly fresh condition—that is, immediately after death—the fibrils of a cerebro-spinal nerve appear as perfectly transparent solid cylinders, with simple sharply-defined outlines (conturen), and it is only later that the two parallel lines are observed, giving the appearance of the double membranes. Occasionally this condition is observed in sympathetic fibrils. Acetic acid coagulates the contained matter of the latter, leaving the cerebro-spinal fibrils untouched; but this is a doubtful mode of distinguishing the two, and has probably given rise to numerous errors. Other uncertain characteristics are mentioned: that, however, on which Bidder and Volkmann rely is the admeasurement of the fibrils. The fibrils of both classes of nerves vary much in magnitude, as is shown by a table in which the diameter of various nerves from man, the cat, the calf, hen, frog, and pike is given. The largest fibrils of the sympathetic are, however, much smaller than the smallest of the cerebro-spinal. Part of this table we give. The figures intimate fractions of the Parisian inch: the nerve examined was the anterior root of a spinal nerve.

	Cerebro-spinal fibrils.		*Sympathetic fibrils.*		
	Smallest	Largest	Smallest	Largest	Dimensions never observed.
Man . .	0·00046	0·00010	0·00015	0·00020	0·00021 — 0·00045
Cat . .	0·00044	0·00077	0·00015	0·00020	0·00021 — 0·00043
Calf . .	0·00044	0·00088	0·00015	0·00020	0·00021 — 0·00043
Frog . .	0·00014	0·00070	0·00010	0·00022	0·00023 — 0·00043

The most usual size was the medium of the two measurements. The greatest variation is observed in the cerebro-spinal nerves. In frogs the smallest observed diameter of a sympathetic fibril was 0·00014 inch, the largest 0·00022 inch; while in the cerebro-spinal system, the two extremes were respectively 0·00022 and 0·00070. In the pike the extreme in the latter is still greater, namely, 0·00024 and 0·000132.

The second division of Bidder and Volkmann's treatise is devoted to a consideration of the connexions between the sympathetic and spinal nerves. In a previous essay,* Volkmann had stated, after having examined all the anastomoses of the cerebro-spinal and sympathetic, that although for the most part the sympathetic fibrils in the cerebro-spinal nerves took their course both to the centre and circumference, yet it was evident that in many places the communicating branches were exclusively peripheral. He stated also that the fibrils of a communicating branch entering the spinal cord were divided into two sets, the one turning towards the head, the other towards the pelvis. In the frog the anterior roots of all the spinal nerves communicate with the sympathetic. The first, or hypoglossal, seemed to Volkmann, indeed, to be an exception: but more accurate researches have removed all doubts. The communicating branch is scarcely distinguishable by the naked eye, and in one instance contained only two fibrils. After joining the nerve the greater portion of the fibres go to the centre, the lesser to the periphery. The

* Ueber die Faserung der Rückenmarkes und des sympathischen Nerven in Rana esculenta. Müller's Archives, 1838, p. 274.

communicating branch with the second spinal, which supplies the arm, is distributed in a contrary manner, the greater portion going to the periphery. The third spinal nerve forming with the second the brachial plexus receives comparatively few fibrils from the sympathetic: they take principally a centric direction. The greater part of the fourth communicating branch runs also centrically; but the contrary takes place in the fifth: in some instances, however, the branch divides into two equal portions for the centre and periphery, and this occurs also in the sixth. The greater part of the fibrils of the seventh, eighth, ninth, and tenth are peripheral The tenth is a very small branch, and appears, in some instances, to be altogether absent. The connexions of the cerebral and sympathetic nerves are traced with the greatest difficulty, and no very satisfactory statements respecting them can be made. It seems, however, that the sympathetic fibrils take in general a peripheral course. Bidder and Volkmann give numerically the actual distribution of the communicating fibrils in five instances, the measurements having been made with the micrometer. The results prove what may be inferred generally from the preceding statements, that the greater portion (more than two thirds) of the fibrils in the *rami communicantes* of the sympathetic take a peripheral course. They show also that the sympathetic is an independent system, and not an appendage to the cerebrospinal.

Passing over the estimate and refutation of Valentin's *lex progressus*, we come to the third division, which treats of the comparative numbers of sympathetic and cerebro-spinal fibrils contained in various nerves and their twigs. If a cerebro-spinal nerve be examined at its point of junction with a communicating branch of the sympathetic, the fibrils of the latter will be found to occupy one side or the other, in compact fasciculi. On tracing the further course of the nerve, these will be found to subdivide into fasciculi, and to unite with similar bundles of cerebrospinal fibrils in a plexus-like manner, subdividing continually, even to their termination, until the fibrils of the two classes of nerves seem to be lost in their elementary constituents, and are completely confounded with one another; and this statement is applicable to all nerves. In the parts supplied with the motor and sensitive twigs the union of the terminating fibrils takes place, however, in a mode highly curious. We shall not follow our authors through the detail of their interesting and laborious researches, but content ourselves with placing the general results at which they arrived before our readers. The term, *small fibrils*, must be understood as applying to the sympathetic fibrils, and the term, *large*, to the cerebro-spinal.

"1. The nerves distributed to voluntary muscles contain very few small fibrils; on the average, about ten per cent. We have discovered no exception to this law in all the four classes of vertebrata. The composition of the vagus shows how stringent this law is; for, although that nerve consists principally of small fibrils, yet those twigs going from it to voluntary muscles are made up almost exclusively of large fibrils. The ciliary nerves of birds and the branches distributed on the cardia of calves exhibit similar proofs of its general application.*

* For the better understanding of the text, we should here state that in birds the iris is under the control of the will. It is evident also that the *ruminantia* exercise a voluntary power over the cardia and the demi-canal connected with it.—REV.

"2. The nerves distributed to involuntary muscles, whether cerebro-spinal or sympathetic, contain an immense preponderance of small fibres; in general about 10,000 per cent.

"3. The nerves of the skin and its appendages contain the small fibrils in great numbers: in general at least 100 per cent., *rarely less* than this number, and often more, as in birds and *whelps*.

"4. In the sensitive nerves distributed on mucous membranes, the small fibrils are usually five times, and sometimes even twenty times more numerous than the larger fibrils. It must not be concealed, however, that particular researches have shown that there are exceptions to this general rule. The preponderance of the small fibrils is most strikingly shown in those branches of the fifth nerve, distributed on the mucous membrane of the nose, and in the lingual branch of the hypoglossal. It is less striking in the superior laryngeal nerves.

"5. The nerves of those mucous membranes which in a healthy condition possess little or no sensibility, are made up almost altogether of small fibrils; we may therefore conclude that the nerves which go to the gullet, stomach, bowels, and urinary bladder are composed almost exclusively of sympathetic fibrils. The difference between the two branches of the glossopharyngeal nerve in the neck is highly illustrative of this fact, for the one which goes to the upper and probably sensitive portion of the throat, although containing a majority of small fibrils, contains also many of the larger; while the second branch, distributed to the inferior and nearly insensible portion of the œsophagus, exhibits scarcely any but fibrils of the former kind. . . . . It appears, then, that the small fibrils constitute the medium of the organic processes, the larger of the psychical actions, (Thätigkeiten,) and when mixed together in a nervous trunk, the one or the other kind is predominant according as the nerve is more subservient to the psychical or organic processes." (pp. 66-7.)

The inferences from these statements are obvious. All parts of the structures of organic life must be supplied with nerves of organic life, and the number of these must be in proportion to the activity of the organic processes. Bidder and Volkmann have confirmed this inference by numerous observations. Thus, in the beak of birds, and in the teeth of mammals, vegetative life is at its minimum, and so Bidder and Volkmann found the number of sympathetic fibrils. In the cutaneous nerves of birds they are very numerous; the moulting and other organic processes carried on in the skin show that the latter enjoys an activity proportionate to their number. The nerves of those parts of the skin of birds, however, which are bare or nearly so, contain very few sympathetic or small fibrils. In those distributed on closely feathered portions of the skin of the common fowl, the organic were to cerebro-spinal fibrils, as 16 to 1, in those on the less feathered skin of the head they were as 5 to 1, and in the nerves on the naked skin of the legs they were as 55 to 42. In the nerves going to voluntary muscles they average about 1 to 10, and in the sensitive nerves they vary from 10 to 1 to 14 to 1.

On the ganglia as giving origin to the sympathetic fibrils. It is well known that the sum of the ultimate branches of the sympathetic is many times greater than that of its trunk. The root of a spinal nerve of a frog, whether motor or sensitive, contains scarcely 2 per cent. of sympathetic fibrils; but a muscular branch contains 10 per cent., and a cutaneous twig above 100 per cent. It is very obvious that these sympathetic fibrils are not given off by the brain or spinal cord; and at this conclusion, after discussing the whole subject *in extenso*, Bidder and Volkmann arrive. Several micrometric observations made with reference to the doctrine that the sympathetic ganglia are the source of the sym-

pathetic fibrils are then detailed, and strongly support this opinion. They found that efferent fibrils of the ophthalmic ganglia of the cat were four times more numerous than the afferent. The efferent fibrils of the cœliac ganglion in the same animal were at least three times more numerous than the afferent. The ganglia on the posterior roots of the spinal nerves of the frog give off sympathetic fibrils. The spheno-palatine and other ganglia were also examined microscopically with similar results. A general summary of our author's views, and an explanation of the plates concludes the essay.

We feel inclined to place much confidence in the observations detailed in this essay. Professors Bidder and Volkmann seem to have taken great pains, not so much to show themselves learned and deep-thinking, as truth-loving and industrious inquirers. The mathematical precision with which these observations are detailed is of great importance. It renders them the more valuable, because it will enable future inquirers to test the accuracy of their statements. We have not alluded to Dr. Hannover's researches; as we propose to notice them separately, so that our readers may themselves compare them with the preceding; and with those we are about to detail.

II. ELEMENTARY ANATOMY OF THE SPINAL CORD. It is well known that the spinal cord, like the brain, consists of white and gray substance; the latter inclosed in the former, and presenting two lateral portions, of a crescentic form, the *cornua* of the crescent being towards the middle line, and connected by a commissure of gray matter. Some continental anatomists, following Rolando, have described a line of perfectly gray matter as running along the posterior part of the posterior horns *of the* crescent, and have given it the distinctive appellation of the gray gelatinous substance, the other being termed the gray spongy substance. (*Substantia cinererea gelatinosa*, and *substantia c. spongiosa, vasculosa.*) According to Remak, the latter contains ganglionic globules; the former, corpuscles resembling the red particles of the blood in frogs. The functions and elementary composition of the spinal cord have been viewed as partly resembling those of the nerves, partly those of the brain; the cord being on the one hand a conductor, on the other an originator, of the vis nervosa. We need not here review the doctrines of physiologists respecting the structure and functions of this organ: suffice it to say, that Dr. Stilling, following Van Deen, having found the results of physiological experiments to differ from those of preceding experimentalists, and not in accordance with previous anatomical views, resolved to examine the spinal cord for himself. The more effectually to accomplish his purpose, he sought the assistance of his friend Dr. Wallach, a dexterous and experienced microscopist, the translator of Dr. Hall's publications, and well acquainted with the current neurological views. The result of Dr. Wallach's observations was, *that the hitherto-acknowledged presence of ganglionic globules in the gray matter is a microscopic delusion, and that the cord is made up solely of fibrils running longitudinally in the white substance, and longitudinally and transversely in the gray*. These results were fully confirmed by Dr. Stilling. We find, however, in the second part, this positive contradiction to the results of previous inquirers very considerably modified. The details of their

united researches into the structure of the cord are given in this, the first number of their volume. Previously to the review of these we would observe, that although the medulla spinalis of oxen, sheep, swine, different kinds of birds, and frogs were examined, the cord of a newly-killed calf was found the most suitable to their purpose, and is strongly recommended by Dr. Stilling to future observers. In summer the cord was frozen, so that thinner slices could be obtained. Dr. Wallach also invented a new form of *compressorium*, for compressing the slices. The examinations of this structure, and indeed of all delicate tissues, under a compressorium is in itself exceedingly objectionable, and leads us to place far less confidence in the results of Dr. Stilling's observations than we otherwise should have done.

Elementary composition of the fibrils of the white substance. They appear as smooth, transparent, colourless tubes, with a double texture, (contureu;) between the two a clear space appears on pressure, and the inner membrane incloses a colourless, transparent substance, which, when pressed out, exhibits irregular granules and minute pieces that readily run together into a globular form. The matter in this state appears of a drab or brownish colour. The empty tubes, looked down upon, appear like bundles of cut straw The membranes of these tubes are in some degree elastic; and sometimes, in manipulating the outer, one is torn open, and, by its retraction, exhibits the inner. Their varicose appearance depends partly upon incipient decomposition, and partly upon unequal pressure while being examined. When fragments of primitive tubes are separated they form into a ring, the two ends joining to each other, and easily give rise to the appearance of the granules of ganglionic globules.

Composition of the gray spongy substance. Dr. Wallach looked most diligently for the ganglionic globules, described by preceding observers as characterizing the gray substance. He examined it in various classes of animals, and in fetuses, and in the young as well as in the adult of amphibia, fishes, birds, and mammals. The result of his researches is, that from the decussating pyramids to the cauda equina there are no ganglionic globules to be found. They are first seen in the medulla oblongata. We find, however, that subsequently to the publication of this first part, Messrs. Stilling and Wallach were led to qualify these statements very much; and in the second part we are presented with a chapter as an appendix to this first, in which certain bodies closely resembling ganglionic globules are described as entering into the composition of the anterior gray substance of the spinal cord, and are termed by our authors spinal bodies. (Spinalkörper.) These bodies are of an angular or a star-like form, with projecting points or spines, by which means they are connected with each other and with the fibrils surrounding them. In size they resemble the ganglionic globules of the spinal ganglia, in form are altogether dissimilar; both have a nucleus and nucleolus, and contain a granular substance, but the latter are round or elliptic, and not angular and with spine-like projections. From this diversity Messrs. Stilling and Wallach conclude that the two are quite distinct. These "spinal bodies" were observed by Remak in the ganglia of the sympathetic, and it appears to us that the microscopic structures (to be hereafter described), figured by Dr. Hannover under the name of "cerebral cells," are not

materially different from those described by our authors. Of course we demur at once to the name given to them. Corpuscles found in the brain and sympathetic ganglia, as well as in the cord, cannot, with any degree of propriety, be termed *spinal* bodies.

These "spinal bodies" are of various sizes, and are found in the anterior gray substance only, lying between or amongst the fibrils. They are most numerous at the points where the roots of the anterior spinal nerves pass out, and more thinly scattered towards the canalis spinalis. At many points, however, these bodies were seen in great numbers round this canal, among the fibrils of the posterior oblique commissure, and at the basis of the cornua of the posterior gray matter, but never within the substance of the latter. They are grouped in heaps like the ganglionic globules, but are not so closely pressed together.

The gray gelatinous substance. If the spinal cord be cut across, the outer and posterior layer of gray matter, where processes of the latter and the white substance indentate with each other, is seen to be inclosed by a substance which has a shining gelatinous appearance. This is the gray gelatinous substance. If the cord be cut longitudinally, it is seen to traverse the latter from below upwards. The continuation of this substance appears on the surface of the medulla oblongata, forming the lateral wall of the inferior portion of the fourth ventricle; it also forms the posterior surface of the medulla oblongata. This substance is composed of very minute primitive gray fibrils, which take a longitudinal direction, and separate the white matter from the gray. They appear under the microscope of a bright golden colour.

Distribution of the blood-vessels. The branches from the spinal arteries first pass between bundles of white matter, and then penetrate the latter, giving it a few branches. They form a fine and extensive network in the gray substance. Since the fibrils of the gray substance are as colourless and transparent as those of the white, Dr. Wallach attributes the grayness to the imbibition through the coats of the vessels of some peculiar constituent of the blood, and that this is undoubtedly connected with the functions of the gray substance and not accidental. It is evident that a greater quantity of blood is necessary to the maintenance of the function of the gray substance, than of the white.

Intimate structure of the spinal cord. Dr. Stilling found the fibrils of the white substance to run altogether in a longitudinal direction, and parallel with these the greater portion of the gray. In the latter, however, there were bundles of fibres running transversely and of course at right angles to the preceding, and presenting a much darker appearance than the gray longitudinal fibrils. These transverse bundles evidently dipped into the white matter, and on increasing the magnifying power, transverse fibres, hitherto unapparent, were seen to accompany the transverse bundles of gray fibrils, and extend themselves deeply between the fibrils of the white.

Dr. Stilling having frozen a portion of the spinal cord of a calf, cut off a thin slice and placed it under the microscope. It presented the following appearances. In the centre a round opening was seen—the spinal canal—surrounded by remarkably delicate fibrils of gray substance. Further, from the centre of each mass of gray substance in the cord, the fibrils are seen to diverge like the spokes of a wheel, or rather like rays

from a luminous object, taking a centrifugal direction, and passing into the white substance; those from the posterior mass into the lateral and posterior strands; those from the anterior into the anterior strands. The distribution of those bundles of gray fibrils into the white substance is not the same in all parts of the cord. In the two posterior *cornua* it is very much alike, but in the anterior cords the distribution is not so regular and beautiful. The fibrils here pass from the centre as three, four, or more thick bundles, continuous with the central gray matter, and penetrate the white substance almost as far as its surface. An innumerable quantity of finer fibrils pass between these thicker bundles, (much finer, however, than in the posterior cords,) going also into the white substance, where, anastomosing with each other, they form the finest possible network.

A circular commissure was described above as consisting of remarkably delicate gray fibrils and surrounding the *canalis spinalis*. We may observe that the diameter of the latter is from 1-12th to 1-16th of a line, the breadth of the commissure about 1-10th to 1-12th of a line. In connexion with this commissure, and applied to it as tangents to a circle are two horizontal layers of fibres, situated (in man) anteriorly and posteriorly, passing from the gray substance of one side of the cord to that of the other, the fibres of which have a fan-like distribution into all parts of the gray substance. Dr. Stilling names these the anterior and posterior commissures. Their breadth averages from 1-4th to 1-6th of a line, and the length (between the two points where the fibrils begin to diverge) from a line to a line and a half. These observations of our author corroborate those formerly made by Mr. Grainger, although they differ as regards the peculiar direction or crossing of the fibres from an anterior to a posterior root. Dr. Carpenter and Mr. Newport also have shown similar transverse fibres passing through gangliated portions of the cord in the articulated, but in these the fibres are always on the same plane.

Termination of the fibrils of the gray substance. We have already stated that the greater part of the fibrils of the gray as well as those of the white substance take a longitudinal direction. Those of the gray, gelatinous substance are, so far as we understand Dr. Stilling, altogether longitudinal, and are traversed by *bundles* only of transverse gray fibrils in their course to the white substance. The most important problem then to solve is, how do the transverse gray fibrils terminate? Dr. Stilling examined portions of the cord in various modes with the following results. Those fibrils of the gray substance which enter into the white, after they have crossed the white fibrils in the most varied manner, run to the periphery of the white substance, and, of course, to the periphery of the cord, and there apparently form loops. These loops, however, according to Dr. Stilling, are not formed by the same fibril, nor are the two limbs of the loop on the same plane, but different fibrils running on different planes join and form the loops on arriving at the periphery; thus constituting a network of connecting loops.

The fibrils, however, of the gray matter do not pass uninterruptedly from the latter to the periphery of the cord to form the network of loops just described, for if a portion of the cord entering the line of junction of the gray and white be examined with a slight magnifying power, and under moderate pressure, the border of the gray substance consists of a

wonderfully beautiful network of loops, into which very few fibrils of white substance enter, particularly in the network bordering the posterior gray masses. From this network the fibrils pass to the white substance to cross and recross with its fibrils in every direction. It is worthy of note, however, that although the two systems of gray and white approximate at so many points, and in such various modes, Dr. Stilling never saw a direct union between the fibrils of the two, or those of the one becoming continuous with those of the other.

The connexion of the primitive fibrils with the roots of the spinal nerves. The constituents of the spinal nerves, after traversing the *pia mater*, become connected with the spinal cord as follows:

1. Fibrils pass through the white substance, and can be most distinctly traced running deeply into the gray. For example, Dr. Stilling traced fibrils from the posterior roots to the anterior gray masses. 2. Fibrils run almost as soon as they enter the cord, between bundles of fibrils of white substance, to join other bundles of fibres from the adjoining nerves. 3. Others, in fasciculi, form loops, with fibrils coming from the next nerve. 4. Others appear most distinctly as continuations of the transverse, ray-like fibrils of the posterior gray substance; while, 5, the connexion of the anterior roots with the anterior gray substance, is still more distinct. The club-like processes of the latter are in immediate connexion with the primitive fibrils of the roots of the nerves. But, above all, it may be clearly seen that while some fibrils run directly through the white substance into the gray, others form within the former the most varied connexion with the fibrils of other roots of nerves, and cross, in every possible manner, with the fibrils of the white substance itself:—and thus it is clear how the wonderful network within the latter may be derived from the afferent primitive fibrils of the roots of the nerves, as well as from the transverse, ray-like, and, of course, efferent fibres of the gray matter. In other words, the roots of the spinal nerves may be considered as nothing more than the prolongation of the transverse gray substance of the cord; an idea of their anatomy which explains, as Dr. Stilling observes, why an enlargement of the cord is found to exist where nerves are given off.

To recapitulate. The spinal cord, according to the preceding researches, consists, first, of perpendicular fibrils, constituting the white, or cortical substance of the cord: secondly, of transverse and very delicate perpendicular fibrils, constituting the cineritious, or medullary substance, the transverse fibrils crossing at right angles to the perpendicular fibrils of both kinds, and forming a network with those of the white. Thirdly, corpuscles of an angular form, with projecting processes scattered in groups through the anterior gray matter only, but being most numerous at the origin of the anterior spinal nerves. The nerves are direct prolongations of the gray substance. The relations of the gray and the white substance vary in different parts of the cord. As a general rule, the nearer we approach the medulla oblongata the thicker are the bundles of white substance penetrating to the centre of the gray. We shall follow Dr. Stilling in the discussion of these relations, as well in the brain as in the spinal cord, in a succeeding Number. The prolongations of the gray into the white substance are more distinct in the posterior than the anterior and lateral strands, and their connexion and ramifications much

less minute and numerous, for it is rare to see a bundle of gray fibres in the latter.

Physiology of the spinal cord. As the experimental researches of Dr. Stilling have been for the most part made to verify those of Dr. Van Deen, we can classify and compare the results of the two inquiries. To make the results more clear to our readers, we will first give them as laid down by Dr. Stilling, and afterwards review the experiments themselves in connexion with those of Dr. Budge, and with reference to the general subject. In the first place, these experiments corroborate, and render quite certain, the well-known discovery of Bell, that the anterior columns are exclusively subservient to motion, and the posterior to sensation, the experiments having been made with a careful reference to those excito-motory movements which have misled previous inquirers. We have seen that the composition of the two halves of the cord is generally the same; what, then, is the cause of this difference of function? Dr. Stilling thinks that this must be sought for in the separation and dispersion of the fibrils of the gray matter in the anterior white substance, and their complete union, even to the periphery of the posterior white substance. This is the specific difference between the two halves, and he therefore infers, that sensation is hindered by the intimate connexion of the white and gray fibrils in the anterior white substance. He thinks this view will also explain why the two layers (of gray gelatinous substance?) which separate the posterior from the lateral strands, and which are the entrance-point of the roots of the nerves, are the most sensitive of all.

The afferent and efferent properties of the posterior and anterior divisions of the spinal cord are also further established by Stilling, Van Deen, and Budge. But it does not appear that the white substance is the conductor of the stimulus. According to Dr. Stilling, if the whole cord be cut through, so that the posterior white substance only be left untouched, sensation is annihilated in the parts of the body below the section; but if, on the other hand, the posterior white substance only be divided, sensation continues (although perhaps not so vividly,) in the parts below the section. It is true that if the posterior white substance be irritated with a needle, the expression of pain is much more decided than when the gray matter of the surface of the *divided* posterior column is irritated. The anatomical arrangement of the fibres shows, however, that the gray fibrils are much more likely to be irritated when in their undisturbed connexion in the white substance, than in the destroyed gray matter. Dr. Stilling, therefore, comes to the conclusion, that the longitudinal fibrils of the posterior gray substance conduct sensory impressions from the periphery to the brain,—a proposition in perfect accordance with all the results of experiments.

What is the use of the circular commissure? It contains no decussating, but only parallel fibres, nor do the adjoining portions of the transverse commissure. From a consideration of these facts, Dr. Stilling has been led to suppose, that these structures serve as conductors of impressions from one side of the cord to the other. That there is some such bridge of communication appears certain from the results of Van Deen's experiments (corroborated by Stilling), that when one lateral half of the cord only is cut through, the parts below are deprived neither of sensa-

tion nor voluntary motion. Again, if one lateral half be divided to the median line, at one point, and the other lateral half be divided at a second point, higher or lower than the first, sensation may be still communicated, and reflex and voluntary movements excited.

Do the longitudinal fibrils of the anterior white substance conduct the influence of the will? No—this is the office of the longitudinal fibres of the anterior gray substance. If in a living animal a section of the former only be made, volition can still be directed to the parts below; but if the section be prolonged deeper, so as to divide the latter, voluntary movements at once cease.

What is the office of the transverse fibrils of the spinal cord? They cannot serve as conductors either to or from the brain, for then all must be joined with each other, and thus a continuous line would be formed many thousands of miles long. Besides, when the white substance is cut through, many of these fibres are divided, and yet volition and perception still remain connected with the parts below; so that it is clear their perfect continuity is not *directly* necessary to either the one or the other. We have, seen, however, that these transverse fibrils are prolonged into the nerves, and as we know that the posterior nerves are necessary to sensation, Dr. Stilling thinks the posterior transverse fibres must be looked upon as excitors of the posterior longitudinal fibres of the gray substance. Thus a sensation is called forth *mediately* by the transverse fibres of the posterior gray substance, and produced in the sensorium *immediately* by the longitudinal fibres. *Mutatis mutandis*, the same relations may be given to the anterior gray fibres. As centripetal or efferent impressions pass from the sensitive nerves along the transverse fibrils to excite the longitudinal, and to be thence conducted to the brain, so centrifugal or efferent impressions may pass in a contrary direction, that is, from the brain along the anterior longitudinal fibrils of the gray substance and traverse the transverse fibrils on their course to the roots of the motor nerves. Of course, in the anterior column the longitudinal fibrils of the gray substance are the excitors of the transverse, an arrangement opposed to that supposed to exist in the posterior column. In support of this view, Dr. Stilling refers to his experiments (to be noticed hereafter), and very plausibly observes that it will explain how *sensations* and their dependent phenomena, as secretion, &c., are excited at will; the sensatory influence passing along the longitudinal fibrils of the posterior gray substance, just as the volitional influence traverses the longitudinal fibres of the anterior gray substance.

Dr. Stilling having developed, as he thinks, the mechanism of ordinary sensation and motion, proceeds to consider the origin of those "involuntary movements which are known under the improper name of reflex action." Our readers will recollect that transverse fibrils pass directly from the posterior to the anterior gray substance. The conclusion from experiments, that excitation of the former by a mechanical as well as by volitional stimulus may induce excitation of the latter, and so movements follow, is evidently more fully established by this anatomical fact, as showing the track along which the stimulus passes. We can also, according to Dr. Stilling, understand how emotional excitants, as fear, may act through those connecting transverse fibrils, and excite not only involuntary movements, but also excentric sensations, as formication, weakness of the limbs, &c.

The coordinated movements and sympathies, and irradiation of sensations, are readily to be explained by the commixture and intimate union of the various fibres described, and constituting the elaborate network or plexus in the anterior and posterior white matter, we have repeatedly mentioned. Two problems remain unsolved, and which are left by Dr. Stilling for future consideration. The one is, why the longitudinal fibres of the anterior and posterior gray substance are devoted exclusively to motion and sensation; the other, why the conduction of the anterior and posterior nerves is exclusively centrifugal and centripetal.

Van Deen's Experiments. The publication of Van Deen contains: 1. An essay on the anterior and posterior columns, in which experiments are detailed establishing the doctrines of Sir C. Bell. 2. A treatise containing some recent discoveries of the properties of the spinal cord, and particularly of a nervous circulation in that organ. 3. Supplements to this treatise. 4. A translation of Kuerschner's essay on the Functions of the anterior and posterior Columns, with a criticism by Van Deen.—The second essay and supplements alone demand our notice. As we cannot give these experiments in detail, we shall select the most important: and first, we would observe that Van Deen deduces from them the general principle, that a true circulation exists in the functions of the spinal system of nerves. Impressions are received by the posterior columns and transmitted to the brain, giving rise to sensation; and the animal excites movements—*voluntary* movements—in proportion to the energy of the sensation. If the impressions received by the posterior columns are not transmitted to the brain, but directly to the *anterior* columns,* true sensation is not excited but movement only. The movement is of course reflex, and the impression thus received and acting in the spinal cord is termed by Van Deen reflex sensation—"*Le sentiment de réflexion.*" He proves by experiments that both reflex sensation and motion may be excited after division of both the anterior and posterior white or (as Van Deen terms it) medullary substance; and others are detailed (too long to describe) showing that the reflex sensation is not received by the posterior white matter, and that the anterior white matter alone is equal to the transmission or communication of reflex movements. So that reflex sensation and motion are developed and transmitted by the gray substance.

We shall now detail one or two of the numerous experiments instituted by Van Deen, and from the observation of which his views are deduced. The first experiment we give at length, as it exhibits the mode in which he prepared those unfortunate subjects of his researches, in which strychnine was made use of as a sort of physiological microscope, to develop more clearly the function of the motor track.

"Exp. i. The abdomen of a frog was opened, the abdominal viscera removed, and the vascular connexions of the spinal cord destroyed, so that from the second vertebra to the lower part of the abdomen nothing was left except the bones, muscles, and nerves proceeding to the lower extremities. The spinal cord was then opened carefully in front through the third vertebra, the anterior column divided, and all the blood-vessels destroyed which could connect the anterior with the posterior parts of the body. In this state, one or two drops of a concentrated solu-

* Our author uses the term *posterior* columns instead of anterior, but this is evidently a clerical error.—Rev.

tion of acetate of strychnia were dropped into the mouth, and in a few minutes, the following symptoms were observed: The parts above the section through the anterior column were affected with tetanus, those below were free. If, after the tetanic spasm had subsided, one of the hind feet was touched, but very slightly, reflex movements took place in the posterior part of the body, tetanus in the anterior. But if the head or a part of the surface anterior to the section was touched, tetanus came on in the same parts, but no movement in the posterior portion of the body." (53-5.)

Exp. xxv. If, in the region of the third vertebra both the anterior and posterior column of one side (say the left) be divided, and of course the gray matter lying between them, the sensation of the left hind-foot is not destroyed, for if it be irritated, the animal will exhibit signs of pain moving first the fore-feet and then the right hind-foot, and subsequently the left. The motion of the latter, however, Van Deen subsequently attempts to show is only reflex.

Exp. xxvii. If the spinal canal of a frog be opened from the second to the sixth vertebra, the left lateral half cut through in the region of the second vertebra just below the fore-foot, and the right half lower down in the region of the fifth vertebra, it will be seen that the hind-feet are deprived of all voluntary motion, but that the voluntary movements of the fore-feet excite reflex movements in the posterior extremities, particularly the left hind-foot. But further: if the hind-feet be irritated, and particularly the left, the animal clearly expresses the feeling of pain. Again, if the vascular connexion be completely destroyed in the mode previously stated, and a little strychnia be placed in the mouth, tetanus is shortly seen to affect the anterior extremities instead of the posterior. If, after the spasm has ceased, the fore-feet be slightly touched, tetanic spasm affects one hind-leg, reflex movements the other; but on the contrary, if the hind-feet be touched, tetanus is excited in both. The same results follow if the frog be not poisoned, but only decapitated.

These are one or two of the more important and interesting of Van Deen's experiments, but we must add, that we are obliged to leave others quite as ingenious altogether unnoticed. The next points Van Deen seeks to establish are, 1, the existence of a circulation through the nerves, or of a nervous power, *circulatio nervea, seu vis nervea:* the latter term is preferred by our author: and 2, that the nerves are not prolongations of the white substance of the cord. These views are but a repetition of those previously stated.

In the first of the two supplements which follow the treatise just analysed, Van Deen explains and elucidates the experiments already described; and in the second details additional researches. He also discusses the opinions of Bell, Majendie, Carus, Kronenberg, Valentin, Volkmann, Müller, and Hall. Van Deen, although acknowledging and further elucidating the physiological theory of the latter, maintains that his anatomical views are erroneous, and that the experiments detailed prove that the excito-motory system of nerves has no existence, neither in the ganglionic or cerebro-spinal system. The ganglia of the former differ from those of the latter only in being connected with the brain mediately by communicating fibrils, while the gray substance of the ganglia of the spinal cord, as in direct contact with the brain. The spinal cord in a frog may be changed into a series of ganglia, by removing at given points the

whole of the gray matter, leaving only the posterior white substance in connexion with the brain. This supplement ends with a résumé of the author's views, respecting the functions of the spinal cord as deduced from his vivisections, which, in justice, to Van Deen, we give at length.

"1. The anterior white substance of the anterior columns is subservient to motion only. 2. The anterior columns with their gray substance are subservient both to sensation and motion. 3. That the white substance of the posterior cord is subservient to sensation only. 4. The posterior cords with their gray substance are also subservient to sensation only. 5. The white substance of the posterior columns need not reach to the brain to communicate there the impressions received by the posterior roots. 6. The white substance of the posterior columns, when isolated, does not readily transmit sensation. 7. This can only take place when it is in contact with the gray substance. 8. The anterior white substance, detached from the gray, cannot communicate volitional impressions along the anterior roots directly to the muscles; it can only excite vibrations in them. 9. The conditions necessary to true sensation are also necessary to reflex motion, that is to say, as the former is dependent on the posterior roots and cords, and on the gray substance, so also reflex sensation is dependent on the same structures. 10. Those conditions necessary to the transmission of true sensation along the anterior [posterior*] cords are also requisite to transmit reflex movement along the same cords in the direction from the spinal medulla to the brain, *neither the one nor the other can be effected without the gray matter*. 11. The gray substance communicates impressions from the posterior to the anterior columns, and 12, from one centripetal fibril to another. 13 This is also true of the centrifugal fibrils; for few of the fibrils of the white substance are able to transmit by means of the gray substance the volitional impressions of the brain to almost all those anterior roots which derive their origin from that part of the spinal cord corresponding to these few fibrils. 14. That the centrifugal and centripetal fibrils ought to be considered as conductors, and the gray substance as the active centre of the nervous system." (pp. 199-200.)

STILLING'S EXPERIMENTS. The important doctrines deduced by Van Deen from his experiments, (of which we gave his own summary in our Twelfth volume, p. 514,) and the boldness and apparent exactitude of the latter, struck the notice of Dr. Stilling, a practitioner of Cassel. He undertook the important and laborious work of repeating them; and in the work before us has reviewed them in detail, giving also a description of the mode which he adopted to verify them. With very few exceptions he declares that the experiments of Van Deen are erroneous, or, as he expresses it, false, and that consequently his doctrines are in many points erroneous. The inferences numbered 1, 2, 3, 10, 12 are utterly objected to by Stilling, and several of the remaining admitted only with limitations. So far as a perusal of the two authors enables us to decide, Stilling makes out a better case than Van Deen, yet we think with a great deal of unnecessary harshness of expression, and occasionally with an apparent exactness and positiveness which are somewhat suspicious. The correct performance of experiments so complicated as those detailed, and upon structures so minute as the divisions of the cord in the frog, can only be attained by an incredible degree of dexterity; and although both our physiologists claim credit for this dexterity, having operated upon many hundreds of unfortunate frogs, we are by no means ready to admit their claim to its full extent. Although Stilling, having had the ingenuity and experience of Van Deen to assist him,

* Anterior here must be a clerical error.—REV.

makes out apparently a better case, we must see his researches corroborated by at least one competent witness before we can officially give our judgment against the Dutchman. The whole of Van Deen's experiments with strychnine seem to be fairly invalidated, so far as they refer to the point aimed at; because, firstly, his mode of preparing the animal does not arrest the circulation within the cord; secondly, the transmission of the poison from one part to the other takes place by imbibition, a small piece of connecting cord sufficing; and thirdly, this imbibition is influenced by gravity. Stilling observed the phenomena almost exactly as described by Van Deen, if the animal was placed on its feet and belly; but if laid on its back, or if its hind-feet be raised higher than its head, so as to hinder the circulation from the anterior to the posterior half, the results are very different indeed: and this fallacy runs through all his experiments. Again, in the experiments to elucidate the functions of the anterior white matter, Stilling contends that Van Deen irritated the *roots* of the anterior nerves, which are microscopically small in the frog, and not the *substance* only of the cord. Many of the other results of Van Deen's experiments are flatly contradicted, as we have before observed. Those in which strychnine was used as the physiological magnifier of spinal action, are the most interesting of the experiments detailed by Dr. Stilling, because they throw light as well upon the nature of the capillary circulation in the spinal cord as upon its proper function. The tenacity of life possessed by frogs is extraordinary. Dr. Stilling prepared a great number in the mode described by Van Deen in exp. i, which, when let go, would jump about with the greatest activity and ease, so that no one would suspect that the viscera and large blood-vessels of the animals had been entirely removed, and nothing left but the osseous, muscular, nervous, and capillary systems. Generally, in about half an hour, the animal leaps with less energy when irritated, shuts its eyes as if slumbering, and the respiration becomes less and less frequent, until at last death is imminent, and movements are no longer excited by a stimulus. In many frogs, Dr. Stilling has excited reflex movements a full hour after evisceration, according to Van Deen's method, by applying acetic acid to the skin. It is a necessary inference that the cord may continue to perform its functions for at least from half an hour to an hour after the general circulation of the blood is destroyed.

If the spinal cord of a frog, thus completely eviscerated, be exposed, and touched with a few drops of a solution of acetate of strychnine, at one point only, in five minutes general tetanus occurs, just as if the strychnine had been taken into the system in the usual way. If the slightest bridge of communication be left between two divided portions, the effect is the same, and transmission takes place contrary to the force of gravity; as for example, from the lower part of the cord to the upper. This, as is shown by subsequent experiments, is not due to imbibition only, for when the blood-vessels are so destroyed that all vascular communication between the upper and lower portion of the cord is cut off, the lower end still exercises its functions as well as the upper. From this Dr. Stilling argues, that there is a continuous capillary network within the parenchyma of the cord. An isolated piece of the cord will also react to strychnine, in the same way as the whole. Thus, if that portion in connexion with the fore-feet be entirely separated, above and below, from the rest, so that

all communication with the head, or inferior extremities, be cut off, and then touched with a solution of strychnine, the fore-feet become tetanic. Dr. Stilling shows, that each portion of the spinal cord is a complete apparatus in itself, independent of the brain, or the other portions of the medulla, and able to transmit influence along the motor nerves in connexion with it; that, in fact, the cord may be divided into as many complete portions as there are pairs of motor nerves,—an opinion, by the way, dwelt on by Van Deen. Dr. Stilling fixes the seat of tetanus (which he terms "a paroxysm of reflex movements,"—Ein Sturm von Reflex-bewegungen,) in the anterior gray substance.

Dr. Stilling made various sections of the spinal cord and brain of frogs. The whole of the cerebral axis was divided into two equal lateral halves, by a longitudinal incision carried along the median line from the cauda equina through the cord, the cerebellum, the corpora quadrigemina, and the brain. In ten minutes after the operation, reflex movements may be excited, but they are confined entirely to that side to which the irritation is applied; no stimulus whatever can induce them in the opposite side. If the cerebellum (or the striæ that are the analogue of it,) and the brain be left undivided, and the cord be bisected along its whole length, irritation of a hind-foot will excite action in the abdominal muscles of the same side. If one or other nostril be irritated with a couching needle, the fore-leg of the same side is immediately directed to the part, and energetically endeavours to remove the irritating instrument; and when Dr. Stilling has forced the mouth open, to drop in a solution of strychnine, the animal has attempted to remove his finger with both fore-paws, but the action of the two paws was not harmonious as in unmutilated frogs. If the fore or hind-feet were irritated, flight was attempted with all parts of the opposite, as well as of the same side. A frog, with its spinal cord thus divided, strenuously attempted to escape from the needle which it saw ready to irritate it, and, in its violent efforts, brought the left hind-foot so far forward, that the web covered the side of the creature's head. From this and other statements in the books of both Van Deen and Stilling, we infer that sad cruelties have been practised on these beautiful, and (if these experiments be truly detailed,) intelligent animals. The physiological conclusion is, that the combined movements, requiring the action of the two sides, are rendered inharmonious, unless the irritation applied to one side is sufficient to reach the uninjured brain, and so pass to the opposite. It is subsequently stated in a note, (p. 128,) that if the central axis be unequally divided along its whole length, the muscular action is the stronger on that side on which the lateral half is the larger, so that the body of the animal forms a half circle, as in pleurosthotonos; or, if the cord be unequally divided at one part only, then the corresponding limbs are respectively weaker and stronger.

Van Deen's xxvth experiment, which we have shortly detailed, is important, as proving the transverse transmission of motive and sensitive influence. Dr. Stilling's repetitions of this experiment confirm that part of Van Deen's inference which relates to this point; Dr. Stilling insists, however, that the motions referred to are not reflex, but voluntary. He also attempts an explanation of this new fact in physiology, by supposing that the volitional impulse is excited upon the spinal cord generally, and

from thence to special muscles along the anterior nerves. For the proper distribution of this impulse he infers from his experiments, (and it must be remembered, as of importance in estimating the value of his anatomical researches, that this theory preceded the latter,) that there is a peculiar anatomical arrangement, of such a kind that the one half of the cord is able to receive the excitation of the other, the upper portion that of the lower, and *vice versâ*. By this relation of the various portions of the cord to each other, we can understand the co-ordination of movements. The same doctrine applies to sensation. In this, the xxvth experiment of Van Deen just alluded to, the irritation applied to the right hind-leg passes through the right posterior roots into the right lateral half of the cord, and through the posterior into the anterior white and gray substance: the latter communicates the impression, at the same moment, to the left lateral half, above the transverse section, and from thence upwards, in both sides of the undivided cord. Experiments xxvi, xxvii of Van Deen, are only modifications of the xxvth; each half of the cord is divided at *two* points distant from each other, (opposite the second vertebra on one side, opposite the fifth on the other,) with similar results as to the transverse transmission of both volition and sensation. In his xxviiith experiment, Van Deen makes two sections in the opposite halves of the cord, but only a line or two apart, and shows, that in this case, no transmission of volition or sensation across the cord takes place. This inference Dr. Stilling flatly contradicts, and almost insinuates that Van Deen can never have made the experiment; not unbiassed in this, mayhap, by his own little theory of that "peculiar anatomical arrangement," in virtue of which a very little connecting link of spinal cord *is* a sufficient bridge for volitional or sensory impression to travel over. *If* energy in protestation will convince, Dr. Stilling is very convincing.

The next series of experiments are intended to illustrate the functions of the white and gray matter in the anterior and posterior strands. The posterior white matter in the region of the third vertebra of a frog was completely removed, with the greater part of the posterior gray matter; the hind-feet of the animal still exhibited both sensation and power of voluntary motion. The posterior white and gray matter was entirely removed in the same mode, together with a portion of the anterior gray matter; the hind-legs were still capable of reflex and voluntary movements, but utterly insensible to any stimulus. A portion of the spinal cord was removed, as in the preceding, so that only the anterior white substance remained to connect the upper and lower portions of the cord, all the gray matter, and the posterior white matter, being completely removed: the hind-feet were utterly incapable of sensation or voluntary motion, or of reflex movement, when the irritation was applied to parts above the injury, as the head or fore-feet. When the hind-feet, or anus, were irritated, reflex movements are excited in the former, but not in the anterior extremities. One or two other experiments of this kind are shown to exhibit the same results. Dr. Stilling makes the interesting remark, that the animal which has been thus deprived of the use of its hind-legs, makes strenuous efforts to move forwards with its fore-legs, and exhibits all those muscular movements in the eyes, neck, &c., which indicate intense suffering. He takes occasion to compare the general muscular acts of a man who is putting forth his whole strength with those

which express pain, and shows the great similarity of the two; an analogy not without an important application to the theory of reflex acts. This part of the book closes with an experiment, from which, in connexion with the preceding, Dr. Stilling infers, "that so long as the continuity of the gray substance of the cord, and of its connexions with the roots of the nerves is unbroken, the white substance may be cut through, both on the anterior and posterior surface of the cord, whether at points close to, or distant from each other, without either true sensation or voluntary motion, reflex sensation (sensation of the cord after the removal of the brain,) or reflex motion being thereby abolished." (p. 197.)

The next section of Dr. Stilling's book is devoted to a criticism on Van Deen's explanation of his experiments. Tigers are forbidden to devour tigers, so we will leave this criticism in possession of all its weight with those who may read the original. The discussion is, for the most part, theoretical; and we suspect our physiological readers can theorize for themselves, as well as either of our authors. The section closes with a hypothetical explanation of the anomalies developed in comparing reflex and voluntary movements, and Dr. Stilling infers that there must either be two classes of motor and of sensitive fibres, or that different parts of the cord have different functions. The former, he says, have not yet been anatomically demonstrated, we therefore take this opportunity of directing his attention to the researches of Mr. Newport and Dr. Carpenter, reviewed in our last Number, p. 171.

Van Deen's theory of a nervous circulation is next criticised and opposed. Dr. Stilling here refers to the action of flexion and extension, an important class, respecting which we as yet know little. He views extension as a voluntary, flexion as a reflex act; the one excited by the brain, the other by the cord, in which it must be performed, or specially favoured, by a suitable anatomical arrangement of the fibres. Dr. J. Budge has come to a similar conclusion, though we suspect in his case, as in Dr. Stilling's, the theory has developed the experiments rather than the experiments the theory. In opposition to Van Deen's views, Dr. Stilling maintains that every impression on the cord, whether it be volitional or sensory, acts on the whole mass of the cord at the same moment, and only allows that particular points or divisions of the cord may be more strongly impressed than others. For example, he maintains that in making any volition efforts, even the slightest, as the act of writing, there is a certain amount of tension in the whole cord, and, of course, in the whole muscular system, although that tension is greatest in that part of the cord with which the muscles of the head and arm are connected. Is it possible that in certain combined mechanical acts of flexion and extension, as perching, flying, &c., there is an alternate state of action and repose in two opposed structures of the cord, just as there is in the heart, the respiratory muscles, &c.? In this way we may explain many unexplained phenomena. These views of Van Deen and Stilling are applicable to various pathological states of the nervous system, especially to centric structural changes; but these applications we must leave to our readers, and close our review with Dr. Stilling's own résumé of his views. We would first, however, observe that he is much more indebted to Van Deen than he is willing to acknowledge; that he has profited largely by the ingenuity and experience and (we must add) mis-

takes of the latter; and that in fact the impulse to his researches, both anatomical and physiological, is derived from the Dutchman.

"1. The posterior roots are sensitive and not motor. 2. The anterior are motor and not sensitive. 3 The posterior white substance is sensitive when in connexion with the posterior gray matter, otherwise it is not. 4. The posterior gray matter is sensitive whether in connexion with the posterior white matter or not. 5, 6. Neither the anterior white nor gray matter are sensitive whether in connexion or separate. 7. Motion takes place, specially through the anterior gray matter, whether it be voluntary or reflex .... 8. The anterior white matter receives impressions from the anterior gray matter, communicates them to the roots of the anterior nerves, and so develops motion, whether voluntary or reflex. 9. The posterior white substance receives impressions from the roots of the posterior nerves, communicates them to the posterior gray substance, and thus the latter is the medium of sensation. 10. Sensation takes place solely through the posterior gray substance, and never without its agency. 11. The posterior as well as the anterior white substance acts across the cord and not longitudinally; the one conducts *to* the axis of the cord, the other *from* the axis towards the circumference. .... 12. The influence of the will always acts on the whole mass of the spinal cord, but stronger on some points than others. The development of that influence, however, takes place solely through the anterior gray substance. 13. Every sensory impression (empfindung) acts on the whole spinal cord, but stronger on some parts than others; this development occurs solely through the posterior gray matter. 14. So long as a small portion of the posterior gray matter connects the lower portion of the cord with the upper portion and the brain, sensation remains unchanged in the inferior extremities. 15. And so long as a small connecting bridge of anterior gray matter connects the upper and lower portion of the cord, so long voluntary motion remains, more or less perfect, in the inferior extremities. 16. The same laws apply to reflex sensation and reflex motion as to true sensation and voluntary motion. 17. Reflex movements and the coordinate movements accompanying volition, have both their *origin in* the peculiar anatomical arrangements of the spinal cord. 18. The coordinate movements may occur during primary reflex movements, excited through the sensitive nerves, without the cooperation of the roots of the sensitive nerves, or of the posterior white and gray substance. Neither is the presence of the posterior roots necessary to the propagation of the reflex change to parts of the cord not originally excited. 19. The mode in which impressions are communicated from the periphery to the spinal cord and brain, as well as the mode in which the will acts from the brain on the spinal cord and nerves, is quite unknown, and all notions of a circulation of nervous principle are founded altogether on deception and error. 20. The gray matter of the cord is the proper and principal agent from which the white substance derives its powers. Sensation and motion are both derived primarily from the gray matter, and the white substance forms, modifies, and gives their peculiarities both to sensation and motion. The nerves only act as conductors to the spinal cord." (pp. 305-10.)

The plate attached to Dr. Stilling's work contains a demonstration of the mode in which the spinal column of frogs should be opened, and also figures illustrating the various sections of the spinal cord after Van Deen. Dr. Stilling's descriptions and explanations of his experiments are intelligible and precise, contrasting favorably in these respects with Van Deen's.

THE EXPERIMENTS OF DR. J. BUDGE. The first part of Dr. Budge's publication came out when he was a practitioner at Altenkirchen, a town situate in a wooded, mountainous district, from which he was supplied with many hundreds of mammals and birds for his vivisections. Subsequently he became more ambitious, for on the cover of his second part

we find him announced as a "privat docent" at the University of Bonn. His style and the subjects of his experiments evidently alter with his circumstances; frogs constituting the principal of the latter, and an assumption of profundity the former. According to his plan, a third part is to follow. We shall condense the results of his experiments so far as they refer to the anatomy and physiology of the sympathetic and spinal system, leaving his researches on the encephalic organs and his theories for future discussion.

Arrangement of the sensitive and motor fibres of the spinal cord. The vertebral column of various living animals was opened, and the spinal cord irritated and sliced in various ways. The results are the following:

No portion of the cord is without sensibility; in its whole breadth, its whole length, anteriorly, posteriorly, laterally, and centrally, everywhere, there is sensibility.

The sensibility of the outer layer of the posterior part of the cord is much greater than that of the anterior surface, but the latter being removed, the sensibility of the two is about the same.

The sensitive fibres remain on the same side, along the whole length of the cord, the right on the right side, the left on the left side.

Motor fibres run through the whole thickness of the spinal cord, anteriorly and posteriorly; in short, through its whole circumference.

Although the motor fibrils of the whole body are collected on the anterior surface of the cord, and, consequently, motions appear more vigorous after irritating these, yet the capability of movement is removed by destruction of the posterior strands as well as of the anterior. (p. 15.)

All the fibrils of motor nerves are directed from without towards the middle line of the cord, and from without fresh fibrils are prolonged until they decussate with those from the other side of the cord; those of the lower extremities decussating in the medulla oblongata of the upper ex tremities in the pons Varolii. (p. 27.)

The motor fibrils which are subservient to extension are situate in the anterior column, and decussate the fibrils subservient to flexion, situate partly in the posterior partly in the anterior column, the central ends being in the former. (p. 47.)

Budge maintains, further, that the fibrils of the extensors and flexors of different groups are situate together, just as the corresponding muscles; the flexor fibrils of the right leg lie together in one group, those of the left leg in another, and so also with regard to the extensors. Budge is also of opinion that the anatomical arrangement which determines the coordinate movements is seated in the cord.

An experiment on a dog is detailed, in which part of the dorsal portion of the spinal cord was divided, leaving only a connecting portion of anterior white matter, the whole of the gray being entirely cut through yet sensation remained, though imperfectly in the lower extremities. Budge infers, consequently, that there are a few sensitive fibres in the anterior white matter. We are of opinion, however, that much value cannot be attached to this and several others of his experiments. He confirms, however, the views of Van Deen and Stilling as to the transmission of sensation *across* the cord. Some of the experiments of both these physiologists are repeated and different results obtained. For example, Budge infers that there are no distinct portions of the spinal cord tra-

versed by the will, nor any fibres specially adapted to the communication of it to the roots of the nerves. There are only sensitive and motor fibrils in the cord, with ganglionic globules in different stages of development.

Physiological relations of the sympathetic. Budge made numerous experiments to ascertain the physiological relations of the cerebro-spinal to the sympathetic system. He opened the thoracic and abdominal cavities, and, irritating various parts of the nervous centres, watched what viscera were excited.

The heart. If the medulla oblongata of a frog be exposed, and, the heart having ceased to beat, a needle be thrust into the anterior cords at the upper end, directly in the middle line, and moved up and down, the heart will begin to beat again; sometimes the auricles only, often both the auricles and ventricles will act. Irritation with *kali causticum* produces the same result. The medulla oblongata and cervical portion of the cord was exposed in a cat: it died immediately, but while the heart was beating slower and slower—once only in fourteen seconds—the posterior cords were irritated without result; but so soon as the anterior columns were excited, the contractions increased to one in three seconds. As in this experiment the anterior gray matter appears to have been the origin of the increased motion, it is interesting, as showing that that portion of the cord assists in some, at least, of the involuntary movements as well as the voluntary. Budge's conclusion from his experiment is, that the motor nervous fibrils of the heart lie near the middle line, and in the anterior strands of the cervical cord and medulla oblongata; and that irritation of no other portion of the nervous centres will re-excite the heart's action. In his second part, however, he finds, from subsequent experiments, that irritation of the corpus callosum re-excites the cardiac movements.

As regards the viscera, Budge found that irritation of the cerebellum excited motion of the stomach; irritation of the anterior column of the cord, the corpora striata and quadrigemina, and the optic lobes re-excited the peristaltic of the small intestines; irritation of the cerebellum, and also along the whole length of the anterior column of the cord, and of the same structure, especially at its point of junction with the medulla oblongata, induced vivid contraction of the colon and of the urinary bladder.

In the first part various experiments are detailed, which show that irritation of one side of the cerebellum—for example, the left—caused the right testicle to be raised up, so that the spermatic cord formed nearly a right angle on itself. The uterus, fallopian tubes, and ductus deferens have a similar connexion with the cerebellum. In the second part we find the result of these experiments confirmed, with this exception, that irritation of the cerebellum excited movements in the organ of the *same* side as well as of the opposite. Perhaps we ought to observe here that Bidder and Volkmann irritated the third communicating branch of the pike, the fibrils of which are distributed peripherally with the spinal nerves, and movements of the anal fins were induced. The preceding results are all we shall present to our readers from Budge's publication. We may state, however, that other matters are discussed at length; as, for example, the nature of voluntary motion, and of a power seated in

the cerebellum termed by him "Hemmungskraft," which restrains or counteracts the action of the nervous centres on the muscles. The involuntary respiratory movements, and the nature of sensation and reflex motion are also considered at length. Dr. Budge concludes, with respect to the latter, that there are no reasons for believing, with Dr. Hall, in the existence of excito-motory fibrils distinct from those of true sensation and volition. There are only sensitive and motor fibres in the spinal cord. He also thinks that the latter is not the only organ in which reflex motions are developed. (Heft ii, pp. 232-5.)

The brochure of Dr. Benedict Schultz consists of two divisions, and seems to be the performance of a young physician. In the first we have a good summary of the modern physiology of the spinal cord, as well as its pathological applications. The views of Müller, Hall, and Stilling are examined at length, as to the excito-motory system, and our author, like most of his countrymen, takes the opportunity of doubting the anatomical existence of Dr. Hall's excito-motory nerves.

In the second division we have a notice, translated from the Polish language, of a paper communicated to the medical professors of the Iagellonic University at Cracow, and published by them in their Annual Transactions. It appears that the faculty possessed by dilute acetic acid of rendering certain animal tissue transparent has enabled Purkinje to discover a distinct nervous tissue in the pia mater and dura mater of the spinal cord, composed of numerous fibrils, analogous, apparently, to those of the sympathetic system.

Our allotted space being occupied, we shall notice the other works named at the head of this article in our next Number.

ART. VIII.

Report on the Sanitary Condition of the Labouring Population of Great Britain: a Supplementary Report on the results of a Special Inquiry into the Practice of Interment in Towns. By EDWIN CHADWICK, Esq., Barrister at Law.—*London*, 1843. 8vo, pp. 280.

WE can assign two or three reasons for presenting the subject of general hygiene from time to time to our readers. The first is the conviction that the political advancement of the profession will be in proportion as medical science is applied to social economy, or in other words as it ameliorates the moral and physical condition of the people, the great object of hygiene. Secondly, to those who think less of the political aggrandisement, than of the scientific progress of the profession, we would state that the cultivation of general hygiene will necessarily lead to those innumerable observations, and the immense generalizations on which this advancement really depends, and the attainment of which has not only been beyond the reach of the profession hitherto, but will we believe remain so if no exoteric aid be afforded. A striking illustration of our argument is offered to our notice in the Report before us. Actuaries have taken it for granted, (and really upon very insufficient grounds,) that the number of persons living in each year to each death, expresses the average duration of life in years; as, for example, the deaths being at the rate of 1 in 22 annually, the average duration of life to to all is twenty-two years. Mr.

Chadwick states the proposition differently; "by nearly all statistical writers," he says, "the proportion of deaths to the population and the average ages of death are treated as equivalent," meaning however, (as appears by the context,) not the proportion of deaths to the population, but the proportion of the living to each death. However, Mr. Chadwick shows in an essay which forms an important part of the appendix attached to his 'Supplementary Report,' that this proposition is quite erroneous, and not founded on fact, and this from data obtained from the deaths in the *two millions* of the metropolitan population. Now what purely professional association, or even medical corporate body could have secured these extensive data? But Mr. Chadwick can go further; while he shows that the deaths and average ages have no relation,—in the Islington district, for example, the deaths are 1 in 55, and the average duration of life only twenty-nine years, whereas it ought theoretically to be fifty-five years, proving in fact that the average is a varying quantity,—he is enabled from the same source, to show some of the circumstances which accompany these variations, particularly those having respect to the state of the habitation, drainage, sewerage, &c., and the occupations and domestic condition of the people. We again ask what means are there *within* the profession for obtaining observations so numerous and generalizations so extensive as these? The cultivation of general hygiene, and that alone, has led, or can lead to them.

The more these matters are considered, the greater will be their acknowledged importance. Yet there is one argument more in their favour, which we cannot overlook. On a previous occasion we remarked that *the study of modern medicine is the study of human nature, and being such there are no questions concerning humanity which it may not assist to solve.* These are imperishable truths, and since the medical profession thus necessarily knows human nature better than others, that better knowledge ought to be usefully applied as well to the science of legislation and government, as to the prolongation of individual life, and the removal of individual disease.

We have made these remarks because it is but a twelvemonth since we reviewed that branch of general hygiene which refers to the disposal of the dead Those who have read Mr. Chadwick's general 'Report on the Sanitary condition of the labouring Population of Great Britain,' would expect a supplement of this kind. Like that Report it is more comprehensive and complete than any work on the subject with which we are acquainted. No available source of information has been overlooked, and we are happy to find that our own review of Riecke's publication has contributed its quota of information.

The Report commences with a discussion of the effects of putrid emanations on the public health. The negative evidence as to their innocuousness, and the facts distinctly showing their fatal effects are both scrutinized, the difficulty of effectually doing so being at the same time exhibited. The conclusion,—one which we believe none will deny,—is, that all interments in churches or in towns are injurious to the public welfare. In a second section, the harm done to the health and morals of the people by the delay of interment is exhibited. This delay is comparatively modern, since we ourselves know, from authentic documents, that at the end of the last century the corpse was rarely kept three days, in fact, was usually

interred on the third day. And this delay is the more injurious, because in a large proportion of families in the metropolis (to use Mr. Chadwick's own language) one room is the bed-room, kitchen, wash-house, sitting-room, dining-room, and frequently the workroom and shop. Statistical inquiries made in the borough of Marylebone show that not more than one family in one hundred has a third room; and the same proportion was observed in the inner ward of St. George's, Hanover square. Of 1465 families residing there, 929 had only one room, and 408 not more than two; but we know, in common with many others, that there are many single rooms in the metropolis occupied by two or three families. Of course a corpse is necessarily retained in the single room when a death occurs, no matter by what disease. Mr. Chadwick gives some melancholy examples of the spread of contagious fevers from this cause. This delay of interment amongst the poor is in some degree to be attributed to their poverty, and the excessive cost of funerals. Under the latter head Mr. Chadwick gives some details exhibiting the waste and distress occasioned to the poor by the funeral societies of undertakers and publicans. At Walsall alone it is calculated that ninety societies of this kind spend £1240 per annum in eating and drinking only. A darker stain on the morals of the people is, however, shown by proved instances of labouring people entering their children in several burial societies, and then murdering them outright, or starving, or illtreating them to death to obtain the sums allowed for interment! One man got £34 3*s*. in this way, on the death of one child, from ten burial clubs.

After demonstrating the excessive cost of funerals, which in England and Wales is estimated at nearly five millions sterling, per annum, and showing that in the metropolis at least more than half of the expenditure is sheer waste, Mr. Chadwick discusses the remedies for these various evils, and at length proposes his own plan, which consists in the appointment of officers of public health. The functions of these persons would be ordinary and extraordinary. The ordinary would be the verification of the fact and cause of death by personal inspection and inquiry, and its due civic registration; the extraordinary would be the direction of such sanitary and juridical measures as the cause of death and the circumstances under which it took place might render necessary. The officer of health must combat contagion and infection by cleansing away impurities, or by the removal or embalment of the corpse. He is to detect murder and denounce it to the coroner, and assist, of course, in getting up evidence. Further: assuming the necessity of national cemeteries, he would also "have charge of the material arrangements, and take the place of the churchwardens and overseer in respect to all places of burial, and be responsible for the control of the servants of the establishment, and moreover be enabled to regulate and contract for supplies at reduced prices of materials and service of the nature of those now supplied by the undertaker." (p. 160.) The officer of health under this arrangement would also be a conductor of funerals, and indeed would be authorized to offer his services as such to surviving relatives. The salary is proposed to be fixed at 19*s*. per diem, (staff-surgeon's pay,) with an allowance for a one horse vehicle.

Mr. Chadwick works very hard himself, and plainly expects every other employée to equal him in his Herculean labours. But let our readers

join us in a little contemplation of the qualifications aud duties required. First, it is absolutely necessary to the *successful* performance of his duties, that the proposed officer have a good general as well as a good medical education, and therewith a special knowledge of general hygiene and forensic medicine. He must also be of gentlemanly manners and pleasing address. Having to meet passions and prejudices, avarice and selfishness in all guises, and in all classes—he must be well acquainted alike with human nature and with business details. In short, he must be imperturbably good tempered, a man of tact, a man of business: humble, for he will have to act as an undertaker; eminently scientific and noble-minded, for he will have to apply medical science to social and political economy. Then as to the labours of the office: In the metropolis and larger towns, even the ordinary duties will be arduous and incessant. Fifteen corpses will be handled by him daily, Sundays *not* excepted, and fifteen will be daily conducted by him to the grave. Add to these the extraordinary duties: The removal of causes of disease—the investigation of suspected murders—the autopsies and analyses—and (a very important item) the return of statistical data, (Mr. Chadwick will, we are sure, provide that this duty shall not be neglected,) and we really think that our catalogue of qualifications and duties will put the staff-surgeon and his nineteen shillings *per diem* quite out of court. Indeed there are no points of comparison between the two services, except that they are both public and both medical.

Our catalogue however, is incomplete. There are factories, prisons, workhouses, lunatic-asylums, schools, manufactories, workshops, and other *quasi* public establishments to inspect; the attendance on sick prisoners, and sick poor to supervise; factory-children to look after, and adulterations and impurities in food and drink, as water, wines, butchers-meat, bread, tea, &c., to detect. These, it is true, are not mentioned by Mr. Chadwick, but they are undoubtedly an important part of the public-health officer's duties.

Mention is made of a "clerk" to the officer of health, and of a cemetery "establishment." From these and similar expressions we suspect a supplementary plan is in Mr. Chadwick's bureau. It is evident there must be a gradation of offices, and a greater complexity of difficult details than appear. The plan will be more difficult to apply to the small agricultural towns than to the metropolis and the manufacturing and commercial towns. Still more difficult will its application be to the rural manufacturing districts, such, for example, as the large parish of Rochdale, containing an area of 58,620 acres, and 84,718 inhabitants. It appears to us that the attendance on the poor, and the duties of supernumerary officer of health might, in districts like those alluded to, be combined in one individual. Of course the guardians of the poor should have no control over him. Indeed, the medical attendance on the poor is the true practical school in which the officer of health should study his duties, and should be the first grade in this new medical service. It would be his "title" to medical orders.

In an Appendix, Mr. Chadwick has supplied some interesting documents, and especially a series of most valuable statistical returns, exposing the erroneous principles in vital statistics to which we have alluded. This essay gives the *coup de grace* also to the Malthusian theory, and we can-

not but congratulate Mr. Chadwick on these two important results elicited by him from the materials at his command. There is a rule of our own for correcting the errors in the averages arising from the understatement of ages which we commend to his notice, namely to the sum of the ages of all dying under one year, add the sum of the ages of as many dying under one month; and to the sum of the ages of all dying aged above one year, add the sum (corrected) of the ages of as many dying under one year. A nearly exact average is the result.

In this short notice we have by no means done justice to the valuable contents of the 'Supplementary Report.' We have discussed Mr. Chadwick's plan rather than criticised his facts, for, knowing that success is the highest praise, we are rather anxious that he should be successful in the application of "the new science of prevention" contemplated, than to give him our critical commendation. The latter is in fact unnecessary, for the volume itself speaks sufficiently for the industry, zeal, and talents of its author.

ART. IX.

Lehrbuch des Nervenkrankheiten des Menschen. Von M. H. ROMBERG, Doctor der Medicin, &c. Erster Band.—*Berlin*, 1840-43. 8vo, pp. 610.

A Manual of the Nervous Diseases of Man. By M. H. ROMBERG, Doctor of Medicine, Professor and Director of the Royal Polyclinical Institute of the University of Berlin, &c. Vol. I. Part I, 1840; Part II, 1843.

PROFESSOR ROMBERG is of opinion that the diseases of the nervous system should now be considered scientifically. He has been led to this conclusion from a consideration of the numerous researches instituted of late years by physiologists, and of the important results which have followed; and he has been induced to act on that opinion from the conviction that no work has yet been published in which the neuroses were so discussed. We need scarcely say that important as modern neurological discoveries confessedly are, the physiology of the nervous system is as yet undeveloped, and can only be but very imperfectly applied to pathology. There is more to be filled up than the gaps acknowledged by our author. Whole fields of research remain altogether unexplored, and we find that the further we advance the more we have to discover. This is not written with intent to disparage Professor Romberg's labours; on the contrary, we think that he has manfully grappled with a difficult subject, and we gratefully accept his work, to use his own phrase, as the first step in the right direction.

His classification of nervous diseases is founded on the four great functional divisions of the nervous system, namely, the sensitive, motor, mental, and nutrient. Upon these, four classes of diseases are formed, namely: 1. The Sensitive neuroses. 2. The Motor neuroses. 3. The Phreno-neuroses. 4. The Tropho-neuroses.

The first part of this, the first volume, is devoted to the Sensitive neuroses; the second to the Motor neuroses. The following are Professor Romberg's subdivisions of his first class—the Sensitive neuroses. The

class divides naturally, according as the normal sensibility is increased or diminished, into Hyperesthesiæ and Anesthesiæ.

ORDER I.—HYPERESTHESIÆ OF THE NERVES.

A. *The Cerebro-spinal Nerves.*

GENUS 1. *Cutaneous hyperesthesiæ.*
a. Neuralgia. *b.* Pruritus. *c.* Ardor. *d.* Algor.

GENUS 2. *Muscular hyperesthesiæ.*
a. Neuralgia muscularis. *b.* Vertigo.

GENUS 3. *Pneumo-gastric hyperesthesiæ.*
a. Neuralgia—Globus, Pyrosis, Gastrodynia neuralgica. *b.* Bulimia. *c.* Polydipsia.

GENUS 4. *Sensual hyperesthesiæ.*
a. Hyperesthesia optica. *b.* H. acoustica. *c.* H. olfactoria. *d.* H. Gustatoria.

B. *Hyperesthesiæ of the Sympathetic Nerves.*

GENUS 1. Hyp. plexus cardiaci.
„ 2. „ solaris.
„ 3. „ mesenterici.
„ 4. „ hypogastrici.
„ 5. „ spermatici.

ORDER II. HYPERESTHESIÆ OF THE CENTRAL ORGANS.

A. *Of the Spinal Cord.*
Neuralgia spinalis.

B. *Of the Brain.*
a. Neuralgia cerebralis. *b.* Hyperesthesia psychica.

The imperfections of this arrangement are obvious. In forming the second order, Professor Romberg abandons, with little ceremony, *his own* scientific principles, and adopts the old empirical method of arrangement. Neuralgia cerebralis is no neuralgia at all—in fact, no definite disease—but simply cephalæa, or violent headach, a *symptom* common to many and very different diseases, as we shall find as we proceed. Nor can we understand how vertigo is to be considered as hyperesthesia of the muscular nerves.

ORDER I. HYPERESTHESIÆ OF THE NERVES. The pathology of the sensitive neuroses must be founded on the physiological laws of sensation. There are three principal laws of this kind. The first is the law of isolated continuity of a nervous fibril and of isolated conduction of sensation from its peripheral to its central termination. This applies, without exception, to all the peripheral nerves. The second law is the law of irradiation of sensation in the central organ; and the third is the law of excentric phenomena, by which the sensations consequent upon change in a sensitive nerve in any part of its course are referred by the individual to its peripheral extremity. This law divides the hyperesthesiæ into the two divisions of peripheral and central, according as they are allocated in any part of the fibril in its course from the periphery to the centre, or in the central axis itself. This law is of very considerable importance in the study of the pathological anatomy of the sensitive neuroses, and in explaining the symptoms of diseases of the nervous system generally. In dissecting a case of crural neuralgia, for example, it would not be sufficient to confine the attention to the seat of pain. The whole course of the nerve must be traced up to its insertion in the spinal cord, and (if it

were possible) through the cord, ganglia of the medulla oblongata, and the lower cerebral ganglia, to its termination in the hemispherical ganglia, supposing these to be the sensorium. By the second law of *radiation of sensation*, we understand how many sensations and motions originate. An impression in the peripheral end of a sensitive nerve, when communicated to the central axis, may there radiate: *a*, upon motor nerves, and give rise to *reflex* muscular notions; or *b*, upon sensitive nerves, and give rise to reflex or sympathetic sensations; *c*, upon a trophical nerve, and originate vascular congestion and secretion.* For example, a strong glare falling upon the eye will excite the reflex sensation of tickling in the nose, the reflex muscular action of sneezing, and reflex secretion from the lacrymal gland; all as strongly and powerfully, in many instances, as direct irritation of the Schneiderian membrane. In neuralgia of the ciliary nerve, the vessels of the conjunctiva are injected, the lacrymal gland excretes profusely, and the orbicularis palpebræ contracts spasmodically. It is thus that irritation of a single fibril extended to the central ganglia induces general convulsions. Other principles flow naturally out of these. The *act of attention* to impressions made on sensitive nerves renders the central termination of the impressed nerve more affectible, and removes it from its normal state in proportion as the attention is concentrated. And as this central change may radiate, and so act upon the trophical nerves of the part, as well as upon the motor and sensitive nerves, structural changes, and morbid sensations and movements may be induced, as occurs, for example, in hypochondriasis. The French metaphysician Bonnet was probably the first to develop this idea of the nature of attention. The phenomena of mesmerism, so called, are examples of the same kind. We have noticed this question in a previous Number. (vol. XIII, p. 13.)

It is manifest that the causes of hyperesthesiæ may be of the most varied character. Some of these are alluded to by Professor Romberg. The reflex action of a peripheral morbid structure on the central axis may, by the law of radiation, induce neuralgiæ; thus, sciatic neuralgia may result from disease of the rectum; pneumogastric hyperesthesia (as vomiting), from intestinal irritation. Poisons, or retained secretions acting as poisons, and acting upon specific portions of the central ganglia, are amongst the more frequent causes of neuralgia. Lead, for example, acting on the spinal cord, induces mesenteric neuralgiæ, acting on the brain induces epilepsy. Morphia, or retained bile, excites *pruritus;* secale cornutum and veratria bring on *formicatio.* The arthritic irritation dependent upon the presence of salts of urea in the blood, and usually concentrated upon the serous or sero-synovial membranes of joints and bursæ, may be diverted to the serous membranes of the central ganglia and of the larger nervous trunks, and so every form of neuralgia, indeed, every form of neurosis, may be developed, and with such activity as speedily to extinguish life; as, for example, when the serous coverings of the ganglia in connexion with the pneumogastric nerve or of the nerve itself are thus affected. Arthritis is mentioned by our author as a frequent cause of neuralgia, but he does not seem to have been at all impressed with the theory of its *modus operandi*, or he would undoubtedly have mentioned so important a matter, slightly at least. Mechanical

* The trophical nerves are distributed to the vascular and glandular systems; they correspond to the organic nerves of Müller.

irritants of every kind demand also a prominent position in the etiology of nervous diseases, and especially of the hyperesthesiæ. The pressure of an aneurism, or of the thickened parietes of a bony canal through which a nerve passes, or muscular action, or external irritants, may be mentioned as belonging to this class.

CUTANEOUS HYPERESTHESIÆ. This genus, containing true neuralgia, presents the best examples of the general laws just laid down, as it most frequently is the result of mechanical injury. Various illustrations are given, principally from English writers, as Abernethy, Wardrop, Denmark, and Swan. Subcutaneous tubercles and neuromatous tumours on the nerve, neuritis, hypertrophy, and ulceration from the proximity of cancerous sores, aneurisms, and tumours, are also noticed in detail. The treatment recommended in each case is precisely that generally adopted in England.

Neuralgia nervi quinti. This, the true tic douloureux, is considered at great length. Professor Romberg acknowledges that the facial nerve is sometimes the seat of pain, but combats the opinion advanced by Gädechens and Arnold, that it has a double function, and that the *portio intermedia* of Wrisberg (*portio minor*) constitutes the sensitive portion. This question we have lately discussed (see Br. and For. Med. Rev., vol. XIII, p. 148). The pathological anatomy of tic douloureux is well illustrated by the history of a case of twenty-six years' duration, commencing at the age of thirty-nine. Froriep conducted the post-mortem examination; we have not space, however, for the interesting result obtained by him. The physiological considerations arising out of it are not less worthy of notice than the anatomical, and are of greater importance, because they contribute to a more accurate diagnosis of this as well as other neuroses. The whole history illustrates the law of excentric phenomena previously stated. The cause of the neuralgia was within the cranium; yet there was no pain in the head, but only at the periphery of the nerve, namely, in the face. It also illustrates the neuro-physiological law of isolated conduction, applicable alike to sensitive and motor nerves. The *pars motoria*, although so near the morbid change in the sensory part, was altogether unaffected, and so also were the other cerebral and spinal nerves. Besides the neuralgia, the patient suffered, during the latter years of his life, from a sensation of vertigo and an inclination to fall over to the left side. This was accompanied with a feeling of weakness in the lower extremities. The fact is curious taken in connexion with the morbid condition of the affected nerve as it passed through the left *crus cerebelli.* It may be considered as a pathological experiment in corroboration of those of Majendie on living animals, in which section of a *crus cerebelli* was followed by a rotatory motion towards the same side. It is also a fact worthy phrenological notice, that although the brain was atrophied and the convolutions flattened, the mental powers were untouched to the last. The patient died of ischuria, and it was curious, too, that ten days before his death, the neuralgic affection disappeared never to return. Of course all treatment was vain; but the greatest ease was obtained by local depletion, occasional purgatives, and a strictly vegetable diet.

We have not space to follow our author through the etiology, diagnosis, prognosis, and treatment of the disease. And it is the less necessary we

should do so, as there is little stated which is not to be found in our own authors. The diagnosis of tic douloureux from painful anesthesia is not always made and is not always necessary. In the latter, irritation of the skin easily induces a paroxysm, in the former it does not. There is one method of treatment, not mentioned by our author, to which we would allude, because we believe it is not generally known, and that is, to paralyse the nerve by keeping the patient continually narcotised for some days. In a long chronic case of true tic douloureux, iu which the agony had become most intense, utterly depriving the patient of rest, we were by this plan enabled to give so much *permanent* relief, that the patient was enabled to sleep for two or three hours continuously. We administered half a grain of acetate of morphia, and three grains of camphor every four hours for three or four days; at the end of which period the paroxysms became more endurable, and have continued so.

Ciliary neuralgia. This is the name given by our author to the affection popularly known as "weakness of sight." A douche twice daily to the eyes, continued for half an hour each time, with water impregnated with carbonic acid gas, is strongly recommended by Jüngken. Professor Romberg observes that he has applied a jet of the pure carbonic acid gas to the eyes in very obstinate cases with the best effect.

Sciatic neuralgia. As this is occasionally confounded with hip disease, we quote the following excellent diagnosis of the two affections:

"The pain is not confined to one part, but extends over the whole thigh, and in particular, the skin is more sensitive to pressure than the deep-seated parts. The patient complains more when the skin is nipped up and pinched, than when the head of the thigh-bone is pressed against the acetabulum. The pain is increased if the patient's attention be directed to the limb during the examination, but scarcely felt if he be engaged in agreeable conversation. There is no wasting of the glutæi, or flattening of the nates. The whole appearance indeed of the limb is unlike that accompanying disorganization of the joint. Sometimes the thigh and nates swell, and in some few cases there is a circumscribed tumour, but not such as to justify the suspicion of an abscess. There is no fluctuation, and the whole appearance of the tumour cannot be better compared to anything than an uncommonly large sting of a nettle. Although no deformity occurs from flattening of the nates, this does happen occasionally from a twisting of the pelvis backwards, so that at the same time it is higher on the affected side than the other, and forms an acute rather than a right angle with the vertebral column. The limb appears shortened in consequence, and in standing the heel does not touch the ground. There is sometimes a remarkable alternation of heat and cold, not merely in the joint but in the whole limb. In the morning it is cold, and of a pale livid colour; in the afternoon it is warm; in the evening hot, shining and congested. Spasmodic contractions of the affected limb are not unfrequent, and convulsive movements, not unlike those of chorea, are excited on pinching or lightly touching the integument. The limb is often jerked up to a considerable height by these spasms. In these cases, there is always a feeling of weakness, and this at last continues after the pain has remitted. Such a state will continue for weeks, months, and even years without any further bad consequences. The patients are almost always young girls, or females who menstruate irregularly, or are of the hysterical diathesis. Hysterical attacks indeed often precede or follow the disease with alternate remissions and returns. Sometimes some severe disease has preceded, and left the patient exhausted in body and depressed in mind." (pp. 66-7.)

Treatment of sciatic neuralgia. When the affection occurs in stout men as an acute inflammatory disorder, local and general bleeding is ne-

cessary. In other instances, the causes must indicate the mode of treatment. To ascertain these, the pelvic viscera should be carefully scrutinised to discover if there be any condition favorable to a morbid reflex or radiate action on the affected nerve as it traverses the spinal cord. Masses of indurated fæces in the bowels, wedging of the child's head on the pelvis, congestion or irritation of the uterus after parturition, are among the local causes. The general causes are too many to enumerate. The practitioner is, however, often unable to determine the cause, and then empirical treatment becomes necessary. The medicinal use of spirits of turpentine is strongly recommended by Professor Romberg. For his mode of administering it, see vol. XIII of this Journal, p. 157. He has also found repeated blisters to the outer side of the knee, and kept open for a few days, very useful in inveterate cases. As a palliative, from one quarter to half a grain of acetate of morphia may be sprinkled on the blistered surface.

Crural neuralgia. This neuralgia, like the sciatic, is very liable to be mistaken for disease of the knee-joint. We have suffered from it ourselves, and more than one surgeon has declared us to be labouring under incipient disease of the knee-joint. We have also met with two such cases in practice. A prognosis of this kind is exceedingly distressing, particularly to the medical patient, who can foresee clearly the course of a "white swelling" through all its stages of suffering to amputation and death. The general remarks on the sciatic neuralgia are applicable here; in addition it may be observed that the pain is quite circumscribed, and the afflicted part exquisitely sensible. In our own case, the sensitive point is a little spot on the outer edge of the patella. There is *sometimes* a slight swelling in these cases round the patella; but when *this is present*, inquiry should be carefully made respecting the previous treatment, as blisters will readily induce this appearance of effusion. Crural neuralgia is often a symptom of diseased hip, the pain being referred to the knee. We remember a case of this kind in which for two years the medical treatment had been directed exclusively to the knee, with the effect of inducing the suspicious tumefaction we have mentioned, but the result of the case showed that the knee was in no degree implicated, but the hip only.

Acrodynia: Neuralgia of the upper extremities. Professor Romberg agrees with Andral in viewing this epidemic as a neuralgia of the palmar and plantar surfaces. It prevailed in Paris in 1828 and 1829. The symptoms scarcely admit of this view; for although the pricking sensations in the skin were followed by partial anesthesia, yet there was exfoliation of the cuticle, and a change in the coloriferous glands, showing an apparent approach rather to an exanthem implicating the tactile and chromatogenous apparatus than the proper neuralgiæ; unless indeed we call any disease by that term in which sensibility is increased or diminished.

Cervico-brachial neuralgia. This, which is a more important class, is left altogether unnoticed by our author. These affections correspond in all points to the neuralgia of the lower extremities. It is stated by Valleix that the ulnar nerve is that most usually affected. There is, however, an affection of the shoulder which we think of more importance if not so frequent. We allude to a neuralgia closely analogous to sciatic

neuralgia. As the gluteal are wasted in the latter, so is the deltoid in the former; in the one, the hip-joint is fixed, in the other the shoulder-joint; in the sciatic neuralgia, the lumbar vertebræ are deflected, in the humeral, the cervico-dorsal. In inveterate examples of the latter, the disease extends itself to other nerves, as of the arm and fore-arm. The intercostal muscles, the serrati and the latissimi dorsi, are also gradually implicated, and at last waste and are paralysed. This neuralgia is manifestly dependent upon a structural change in the central axis itself, gradually extending from a small diseased point until it implicates the nerves not only of the upper extremity, but also of the neck, head, and face.

We must pass over the remaining neuralgiæ of the sensitive nerves, namely, *mastodynia, pruritus, formicatio, ardor*, and *algor*. They are interesting rather physiologically than pathologically. Neither do the muscular neuralgiæ, namely, *anxietas tibiarum* and local spasms, present anything worthy notice.

Vertigo. There is much novelty in the notion which classes vertigo amongst the hyperesthesiæ of the muscular system. The essential characteristic of vertigo, according to Professor Romberg, is the sensation of *apparent* motion (as opposed to *real*,) or of apparent postures. This sensation, he argues, can be derived only from the sensitive nerves distributed to muscles. In proof he mentions the perception of the degree of resistance which the sole of the foot experiences in walking, of the weight of bodies when balanced in the hand, and of the direction in which the limbs are moved. The blind, for example, know when the arm is extended horizontally, or lifted up, as well as those who can see. Prof. Romberg's views are certainly ingenious, but we think he confounds *ideas* with sensations. The estimation of a weight by the hand, for example, is a complex mental act, differing *toto cœlo* from the pain of spasm; it not only presupposes a knowledge of weights, but it assumes the power of comparison. And after all, the illustration is invalid, for it is at least as reasonable and more philosophical to suppose that the sensation of resistance and of weight is obtained through the nerves of touch, nerves of special sense. On this supposition the amount of compression exercised on the nerves between the bones of the hand and the body indicates the weight. In all cases of complete cutaneous anesthesia, the power of estimating weight is lost, because this compression is not felt. It may certainly be objected that the muscular and sensitive nerves are paralysed with the cutaneous. But is there any case extant in which the muscular nerves were anesthetic and not the cutaneous at the same time? We believe not one. Another powerful argument against the views of our author, is derived from the fact acknowledged by himself, that vertigo (as defined) is followed by combined movements, which are independent of the will. Viewed in this way, they are analogous to the reflex movements excited on tickling the soles, the axillæ, &c. When the impression on the sensorial centres is not sufficient to excite movement, it excites the sensation of simple vertigo only; but, when more intense, actual movements follow. This we conceive happens in the curious class of diseases, in which there is rotation in the long axis of the body, or an irresistible propensity to run forwards or backwards, or to climb, &c., as occurs in epilepsy, hysteria, catalepsy. The sensation

of vertigo only may be excited by looking from a height, or it may be so intense as to excite reflex *action*, and the individual is irresistibly impelled to precipitate himself forwards, and so not only risk his neck but a verdict of felo de se, and the forfeiture of his insurance and policy. The whole of the movements alluded to, and we may add the *imitated* movements, are in reality dependent upon another principle as yet but partially developed. We allude to the doctrine that there is a ***peripheral sensorial development within the cranium and vertebral column as well as without; and that the action of ideas*** [?] ***developed on this internal periphery may be reflected upon the motor part of the ganglia and nerves, and motion follow, just as when impressions derived from the external periphery and transmitted to the motor part of the central ganglia are followed by common reflex movements, whether simple or associated.***

Causes of Vertigo. Professor Romberg's arrangement of the causes of vertigo is to us exceedingly unsatisfactory. They may, we think, be arranged under four heads. In the first are those which induce a change in the capillary circulation of the brain; as long-continued recumbency, bloodletting, disease of the heart, compression of the carotids, obstructed circulation through the lungs, sleep during febrile affections, cerebral irritation and congestion. 2. Changes in the composition of the blood, induced either by poisons taken into the circulation, as alcohol, camphor, belladonna, &c.; or by the retention of the excretions consequent on visceral disease. 3. Changes caused by cerebral sensations, as looking from a height, looking at a body in rapid motion, especially if rotatory, or even at a body in motion parallel with the plane of the horizon, &c. *Purkinje's* researches illustrate this class. 4. Structural changes in the encephalon, particularly in the cerebellum and its commissures; a class illustrated by the vivisections of Flourens, Majendie, Bouillaud, Kraus, and Hertwig, and the pathological researches of Greding, Serres, Toulmouche, Andral, and others. The causes of vertigo being so numerous and so widely different, it is mere pedantry in our author to devote one whole page to the treatment.

Hyperesthesiæ of the pneumogastric. The symptoms of these vary as the organs to which the branches of the nerve are distributed. There are, however, some general symptoms in which they resemble the cutaneous hyperesthesiæ. There may be: *a*, *Algor*. Professor Romberg has had hysterical patients who complained of a feeling of coldness in the bronchial tubes, although the air inspired was warm. *b*, *Ardor*, as in pyrosis. *c*, *Pruritus*. This is experienced in the bronchial tubes in bronchitis; and, according to our author, occurs as an uncomplicated affection. Pruritus of the external meatus auditorius from hyperesthesia of the auricular branch of the pneumogastric is sometimes observed, and is accompanied by cough and vomiting. This connexion between the ear and the stomach and lungs is not sufficiently remembered by modern practitioners. Arnold mentions an interesting example of chronic vomiting in a child, which long resisted all curative means, but which was effectually removed by removing a bean from each of the child's ears, that had slipped in while at play. Cassius Medicus has for one of his problems: Why does irritating the ears, as for example, with a speculum, cause sometimes a cough, just as if the trachea was irritated?

d, Neuralgia of the gastric branches appears as gastrodynia, and like tic douloureux is accompanied by altered secretion (pyrosis.) Not long ago, Dr. Graves published a case of neuralgia of the larynx.*

Hyperesthesia of these organs reacting upon the central ganglia will also induce a morbid exaggeration of certain instinctive feelings; when the pulmonary branches are affected, there is a feeling of the need to respire as in dyspnœa; when the gastric branches are implicated, bulimia and polydipsia are excited.

There is a definite hyperesthesia of the vagus, to which Prof. Romberg makes no allusion, namely, the pain and vomiting excited in some nervous patients, especially the hysterical, by the *smallest portion* of *animal* food. It has been termed *kreatic nausea*, and is a sufficiently well-marked disease to merit special investigation. These affections are often arthritic. We have a gouty patient who is always warned of an approaching fit by an insatiable thirst, and which continues until some joint is affected.

THE SENSUAL HYPERESTHESIÆ. Professor Romberg classes spectral illusions among the hyperesthesiæ opticæ. In doing this, he utterly abandons his own principles of arrangement. Neither increased nor diminished sensibility of the optic nerve can be considered as in any way connected with spectral illusions; their site is undoubtedly cerebral. On the other hand, he makes no allusion to that morbid sensibility to certain colours (*chromatophobia*) observed occasionally, and corresponding to the congenital insensibility to particular colours long known to pathologists as an hereditary defect in the individuals termed *idiopts* by Mr. Whewell. There is little else worthy notice under this head.

HYPERESTHESIÆ OF THE SYMPATHETIC NERVES. Professor Romberg allocates the diseases under this head in the plexus of the sympathetic, giving no reason whatever for that arrangement, or any dissections in support of it. We will, however, notice them as we find them.

Hyp. plexus cardiaci. Angina pectoris. Professor Romberg contravenes the old, and, we may add, now exploded opinion, that this disease originates in structural disease of the heart or coronary arteries. It is manifestly a pure neuralgia, of centric origin, but its seat is by no means in the cardiac plexus exclusively. The sensory portion of the cervical cord, or of the respiratory ganglia must more properly be considered the true seat of this painful disease. If a case be watched *ab initio* it will be found that at first the heart is unaffected. The spasm is confined to the respiratory muscles, and the pain is dependent on that spasm, and seated in the muscles, principally the triangularis sterni and diaphragm, although, in one case which came under our notice, the pectorales were also the seat of severe pain—a scraping, tearing sensation—and were felt by the patient to be hard and tense during the paroxysm. As the disease advances the pneumogastric and nerves of the cardiac plexus become implicated, and there is ventricular excretion of gas, weak fluttering pulse, and more urgent dyspnea. But the cutaneous nerves of the skin have also become proportionally affectible, and a breath of cold air, or even pressure on the sternum, will induce a paroxysm.

Arthritis, hysteria, and spinal neuralgia are named by our author as

* Dublin Journal of Med. and Chem. Science, vol. xiv, p. 372.

the most frequent causes of the disease. We believe that hysteria, taken in its most extended sense, is rarely a cause. Women are peculiarly exempt from this and certain diseases of the thoracic viscera. Spasmodic asthma is almost the exclusive plague of men: ten elevenths of the examples of angina pectoris are to be found amongst males,* and cardiac and arterial aneurism in about the same proportion. The arthritic ossification of the coronary and large vessels of the heart is almost peculiar to men, and formerly supposed to be the proximate cause of angina pectoris, probably only a predisposing cause. Indeed it may even be fairly argued that, like other structural changes of the heart, it is a sequel of the affection.

Treatment of angina pectoris. The ossification of the heart and large vessels just alluded to, plainly points to arthritis as one of the casual indications. In these cases Professor Romberg recommends issues and setons in the region of the *heart*—a recommendation quite sufficient to establish the opinion we have already expressed, that Professor Romberg has no idea of the mode in which the arthritic diathesis is connected with the origin of arthritic neuroses. Having already shown that it is in accordance with analogy to suppose that arthritis, whether acute or chronic, may attack the serous membranes of the nervous centres, and through these induce any form of neurosis, the locality of the issue or seton should be the cervical region, and not the cardiac, as recommended by Professor Romberg. In other respects the curative treatment is not different from that generally adopted in England. As a palliative during the paroxysm, Professor Romberg has found that the *inhalation of sulphuric* or acetic ether affords the speediest relief.

Hyp. plexus solaris. Cœliac neuralgia. This affection, as described by our author, is the same as that termed cardialgia, or, popularly, "the spasms." It sometimes assumes an intermitting type. The corresponding spinal nerves and the branches of the pneumogastric are manifestly implicated. Professor Romberg presents us, in his own person, with an interesting illustration of the remarks we have just made regarding the arthritic neuroses. He says, "Arthritis predisposes: I have endured this affection myself, as a precursor of my first attack of gout, and retain a lively recollection of its annihilating sensations and pain, as if the epigastrium was grasped by claws." It is probable that sometimes carcinomatous degeneration of the stomach is only a sequel of this affection.

Hyp. plexus mesentericæ. Lead colic. There is nothing of moment stated by our author regarding this neuralgia, excepting two facts, which necessarily derange his nosological arrangement. The one is, that the spinal cord plays an important part in the affection; the other, that pathological anatomists have failed to detect structural change in the ganglia or branches of the sympathetic

Hyperesthesiæ of the hypogastric and spermatic plexus comprise, according to our author, dysmenorrhea and irritable uterus and testis. His pathology, we need not say, is altogether hypothetical.

ORDER II. HYPERESTHESIÆ OF THE CENTRAL ORGANS. By central organs are here meant only the brain and spinal cord. Professor

* Cyclop. Pract. Medicine, art. Angina pectoris.

Romberg discusses the recent experiments of Majendie, since corroborated by Volkmann, with reference to the sensibility exhibited during vivisections, by the anterior columns and the roots of the motor nerves. It now appears to be established that this is due to the *nervi nervorum*, or the twigs derived from the posterior or sensitive roots, and distributed within the substance of the nerves and to the anterior columns. It is to these nerves that our author refers the pain in myelitis, spinal meningitis, cancerous or neuromatous degeneration of the cord, &c. Examples of these are adduced. It is worthy notice, however, that pain in the spinal cord is not even mentioned in the history of some of these cases, and in others there is no reason given why the pain in the back should be referred to the spinal cord rather than to the spinal muscles and ligaments. And when we come to our author's views respecting spinal neuralgia, as he designates the spinal irritation of English writers, we find that he leaves the subject altogether, and confounds cutaneous neuralgia dependent upon centric disorder with what we should suppose he intended to treat of, namely, neuralgia of the spinal cord itself. He proceeds to detail how, when the cervical region is affected, the pain extends over the skin supplied by the second and third cervical nerves; how, when the upper dorsal portion is the seat, there is *pleurodynia neuralgica*; how, when the lumbar portion is affected, there is tenderness of the abdomen and along the spinal column, pain in the lower extremities, and colic from time to time. Nor are the viscera and consequently the vagus and sympathetic nerves in these various regions exempt. Spasm of the pharynx, larynx, and œsophagus, singular coughs, hiccough, syncope, palpitation, ventricular and intestinal excretion of gas, constipation, ischuria, diabetes, &c., accompany the various forms of the so-called spinal irritation. Now, these phenomena admit of easy solution when properly considered. The cause of the hyperesthesia is centric, and the symptoms are in direct proportion to the extent and degree of this centric affection. If the sensory spinal nerves only are affected, we shall have the true neuralgia described by M. Valleix.* The cause of the hyperesthesia being centrical, all the sensitive twigs passing through the affected portion of the cord will be readily affected by stimuli, and those which ordinarily give no pain, but sensation only, as the tactile twigs, will now be painful. We should therefore, *à priori*, expect that the neuralgia here described will be found to attack nerves exposed by their anatomical distribution to mechanical irritation, or which normally are more sensitive than others. The nerves that traverse bony canals or foramina, or that wind round bones, or have to penetrate muscles, are of this class: so also the special points of sensibility described by Weber, as the middle of the sternum, or of the spine. The trophical nerves are also affected in spinal neuralgia. Tartar-emetic ointment rubbed along the spine in a case of this kind will bring out pustules at the tender points, long before they appear on the unaffected surfaces.

The treatment recommended is that usually adopted by English physicians. The principle of endermic medication is more useful in these cases than in others. We have found useful a liniment composed of belladonna extract ʒij, arsenical solution ℥ss, camphorated oil ℥iss, ap-

* British and Foreign Medical Review, vol. XIII, p. 138.

plied to the spine two or three times a day, and conjoined with salt-water douches; taking care, of course, that the *general* treatment suitable to the case be followed up. The irritation of the spinal nerves or ganglia being thus alleviated, the visceral functions are performed more naturally, and an opportunity is given to the system to right itself.

Hyperesthesia of the brain. Dolor cerebralis. "There is none," says our author, "among the diseases of the brain, in which there is not pain, with the exception of atrophy of the brain." (p. 161.) In the passage preceding this he observes: "It is of importance to remark that when a portion of brain is protruded through a fracture or opening of the skull, it is altogetber insensible to wounding or pressure, whether it be inflamed or projects from the skull as an indurated fungus." And yet he seriously discusses hyperesthesia of the brain proper, as though there were no membranes around it, highly sensible when inflamed, irritated, or compressed; and founds on this simple erroneous symptom of pain in the brain a consideration of the structural diseases to which it is liable. The pathology of cerebral tubercles, hydatids, tumours generally, cancer, abscesses, softening, induration, hemorrhages, meningitis, are discussed *seriatim*, and, to crown the absurdity, the question—Does the seat of cerebral pain indicate the locality of the disease?—is answered in the negative.

Neuralgia cerebralis or *hemicrania* is really a neuralgy of a spinal nerve or nerves, and out of place here. Professor Romberg has observed it to be hereditary. He cautions against the abuse of remedies in the treatment; recommends the recumbent posture, and avoidance of all stimuli during the paroxysm, and attention to the digestive organs in the intervals.

Hyperesthesia psychica. Hypochondria. This disease, in all its phases, is described in a happy and somewhat humorous manner. Our author defines it to consist in the excitement and continued maintenance of abnormal sensations by fixing the mind on the feelings. "The hypochondrist is the virtuosa of the sensitive nerves." To understand the secondary pathology of hypochondria it is necessary to refer to the laws of sensation we have before alluded to. These we need not discuss here; the practical results of these laws are of more importance. At a meeting of the Westminster Medical Society, held Dec. 21, 1833, Mr. Quain detailed one of these. A gentleman who had constantly witnessed the sufferings of a friend afflicted with stricture of the œsophagus, had so great an impression made on his mind (or rather brain) that after some time he experienced difficulty of deglutition, and died of spasmodic dysphagia. Our author justly observes that it is not only wearisome but dangerous to live with a hypochondriac. Professor Romberg, however, like all other writers, fails to give what we think the true or primary pathology of hypochondria. To term it a psychical hyperesthesia is a very compendious but very unsatisfactory mode of explaining it. In pathological language, psychical means cerebral. That hypochondria depends on a local neurosis of the cerebrum is manifest from several considerations. Our own observations corroborate the opinions of Stahl, Whytt, Tode, and Weikard as to the connexion between hypochondria and gout. We have seen it as an acute disease ushering in an attack of gout, and also as a symptom of abdominal congestion in gouty subjects. The morbid

anxiety which characterizes hypochondria is in fact but a modification of that morbid state usually termed mental depression, and which has various causes and various phases between the melancholy of the bilious dyspeptic, and the despair of the suicide. We see this morbid anxiety in the different forms of insanity: in one, concentrated on a provision for offspring; in another, on a provision for self. We see it also in a sequel of hemiplegia and of delirium tremens, and of depressing agencies, whether mental or corporeal. It accompanies paroxysms of hysteria and it is often witnessed in the mesmerized. All these facts point to the conclusion that the leading symptom of hypochondria is dependent upon a local cerebral neurosis. This conclusion must necessarily modify the treatment, and in fact we have been most successful in treating hypochondria as a cerebral affection, and according to its causal indications. In *all* cases, the shower-bath will be found of service, and in those connected with a gouty diathesis, small doses of iron and colchicum (or aconite) in combination with dietetic means. When a sequel of mental agencies of a sorrowful or harassing character, travel and an active life are absolutely necessary for cure.

The anesthesiæ. Professor Romberg introduces these by recurring to the general laws of sensation before mentioned. He lays down the synergies: 1, between the cutaneous and sensual nerves; 2, between the sensitive and motor; and 3, between sensitive and trophical nerves. In treating the cutaneous anesthesiæ, he distinguishes between the peripheral and central. In considering the anesthesiæ of the muscular nerves, he falls into the same mistake as when treating of vertigo, making his confusion on this point worse confounded. Some interesting remarks are made on anesthesia of the vagus, especially with reference to

Respiratory anesthesia. This affection is characterized by insensibility of the bronchia, and the absence of the urgent demand for air. Professor Romberg first noticed it in that form of Asiatic cholera accompanied by asphyxia. An example of the disease as it occurred in a child is given. In this case the respiration was sonorous and difficult without any of the usual expressions of anxiety in the countenance; there was no violent action of the respiratory muscles, and no cough. After death, the *glandulæ concatenatæ* in the neck were found to be filled with tubercles, and had suppurated, surrounding and compressing the vagus, so that at one point it appeared plainly flattened. If a whelp be placed in the receiver of an air-pump, it breathes quicker and quicker, gasps more and more, and at last dies asphyxiated. But if the two vagi be cut at the same time, the animal under the same circumstances gives no signs of distress, and dies quietly in thirty or forty minutes.

It is probable that indigestion or anorexia is occasionally dependent upon a paralysis of the gastric branches of the vagus.

The sensual anesthesiæ. These are next discussed, and to make his arrangement complete, Professor Romberg discusses spinal and cerebral anesthesiæ, in the same loose manner as the hyperesthesiæ of the central axis.

The motor neuroses. Professor Romberg divides the motor neuroses into two great divisions: the *hypercineses* or spasmodic, and *acineses,** or

* Hypercinesis is compounded of ὑπὲρ and κίνησις, from the verb κινέω, I move. Acinesis from α privative and κίνησις.

paralytic. He also fully adopts the anatomical and physiological views of Dr. M. Hall and Prof. Müller. These we need not repeat.

THE HYPERCINESES are divided into two orders :

ORDER I. Spasm from excitement of the motor nerves as conductors.

GENUS 1. The cerebro-spinal nerves in their peripheral or central course. Convulsive tic, trismus, strabismus, nystagmus, torticollis, spasms of the fingers and of the muscles of the lower extremities.

GENUS 2. The sympathetic nerves, of which it is not yet known whether their ganglia possess the central quality of irradiation. Spasms implicating the respiratory muscles, the digestive apparatus, the intestinal canal and genito-urinary systems. [These, we suppose, belong to this genus, for our author gives us no means of learning his opinion.]

ORDER II. Spasms from excitement of the central apparatus.

GENUS 1. Of the spinal cord.

a. Spasms depending on the cord as the combining apparatus, raphania, chorea S. viti.

b. Spasms from exalted reflex action. Hysteria, tetanus, hydrophobia.

c. Spasms from abnormal evolution of the motorific agent. Tremores, namely, T. *potatorum*, T. *senilis*, T. *febrilis*. Paralysis agitans.

GENUS 2. Of the brain.

a. Antagonistic spasms or vertiginous movements, i, longitudinally; ii, anteriorly; iii, posteriorly; iv, alternately antagonistic.

b. Coordinated spasm.

c. Psychical spasms. Eclampsia, E. *toxica*, E. *parturientum*. Epilepsia.

As our allotted space is nearly exhausted, we can only glance at Professor Romberg's views respecting these hypercineses, especially those of the first order, and it is the less necessary that we should do more, because the diseases placed in that order are for the most part connected with the hyperesthesiæ or anesthesiæ already discussed, and as regards the general pathology and treatment, do not generically differ from the latter. The laws of isolated conduction, of central irradiation, and of synergy with the other classes of nerves, apply to the motor equally as to the sensitive; while the anatomical distribution of the two is different only in special instances. We shall notice the more prominent and practical points only.

Contracted hip. We have already given the diagnosis of sciatica simulating hip-disease, and we would caution the practitioner against mistaking spasmodic contraction of the psoas, iliacus and quadratus lumborum muscles for morbus coxæ In the contracted hip, the limb is shortened and attempts at extension excite pain in the nerve. The tendons of the pelvic muscles, and the muscles situate externally may be felt like tense cords.

Spasmodic asthma, or spasm of the bronchi. To palliate the attacks, Professor Romberg recommends that the gastric branches of the vagus should be acted on. He has found small doses of ipecacuan, and the application of cold very useful. Ices give immediate relief; cold-water clysters are also beneficial.

Spasm of the respiratory muscles. Hiccup, yawning, sneezing, laughing, strange spasmodic coughs, &c., are under this head. For prolonged hiccup, cold affusion is advised. Cruveilhier cured two obstinate cases by bending the head back, and pouring the water into the mouth and nostrils of the patients. Spasmodic sneezing may be relieved by emetics.

Spasm of the sphincter ani. Professor Romberg mentions constipation

as a symptom of this spasm. We have observed both constipation and diarrhea in cases of this kind. We quite agree with him that division of the sphincter is the surest and quickest mode of cure.

Passing on to the spinal affections, we find that the first treated of is that induced by using spurred rye as food. (Raphania.) This affection resembles beriberi in many points, and it is rather surprising that Prof. Romberg has not observed the analogy. The disease is scarcely known in England.

Hysteria. Professor Romberg observes that next to exalted reflex excitability, the psychical state indicated by the powerlessness of the will is the most remarkable in hysteria. He adopts Sir B. Brodie's views in this respect, observing that the hysterical motto, "I cannot help it," is often heard. In discussing the causes of hysteria, he alludes to, and adopts the views of Dr. Laycock, as to the ovarian origin of the affection, and as to the extensive influence of the ovaria on the nervous system.

The question of neurological sympathies is illustrated in a limited degree only by the recent neuro-physiological discoveries. We can easily imagine how the testes and ovaria may direct an incident action on the lumbar spinal cord, and excite a reflex action; but how can we explain their influence (as demonstrated by Dr. Laycock,) upon the whole respiratory system, and upon portions of the brain? as, for example, when certain mental powers are excited into operation by ovarian influence? We should have been glad to have seen this matter discussed by Professor Romberg.

He quaintly refers to the morbid *cunning* developed in patients by this ovarian influence. "*Mulieri ne mortuæ quidem credendum est*" is, he says, particularly applicable to the hysterical.

In discussing the general treatment, Professor Romberg lays much stress on the utility of reading aloud in promoting the cure, and we think with some reason. He states also that he knows of no palliative more effectual against the yawning and other respiratory spasms than this. He advises that whatever medicines are prescribed, they should be pleasing in form and small in quantity. "Dirty-looking eight-ounce mixtures," he observes, "and boxes crammed full of pills may please the hypochondriac, but make the hysterical obstinate and anxious, and create ennui."

Tetanus. This disease has been carefully considered by our author, and the best writers consulted. The true characteristic of the disease is reflex irritability in its most intense form. Similar motor disturbance and like spasmodic affections are observed in meningitis, but that despotic power (to quote Professor Romberg's phrase) is wanting which makes the entire muscular system of an athlete dependent upon some slight irritation of a small point on the skin; and this also constitutes the difference between tetanus and spasm of groups of muscles, as the masticatory, even when dependent upon like causes. On these grounds our author argues that the usual division of tetanus into trismus, orthotonus, emprosthotonus, &c. are trivial; and also that the distinction of inflammatory and spasmodic, idiopathic and symptomatic are inadmissible. The nosological division of Mr. Curling into acute, acute inflammatory, and chronic, is also quite erroneous. *T. rheumaticus* and *T. toxicus* are the two forms which are dependent upon a primary affection of the spinal cord, there being no irritation of the peripheral nerves. Rheumatic tetanus is rather a disease of warm climates than of cold, and is scarcely less incur-

able and fatal than the traumatic form. No reason is given for applying the term rheumatic to what is usually termed idiopathic tetanus; indeed the notice of the disease altogether is very meager and unsatisfactory.

Hydrophobia. Strychnine acts directly on the spinal cord; the poison of rabies is limited to the axis of the respiratory system—the medulla oblongata. The irritability of the skin observed in traumatic tetanus is here concentrated on the mucous and cutaneous surfaces, supplied by the pneumo-gastric and fifth pair, and is often so intense, that the contact of the air in common respiration induces bronchial or pharyngeal spasm. In prolonged cases, the spinal motor nerves are affected, and generally tetanus supervenes; but usually the impeded nutrition and respiration are quickly followed by prostration and asphyxia or apoplexy.

Hydrophobia is one of the most undoubted of the *opprobria medicorum.* The seat of the disease itself sufficiently explains why, and we think Professor Romberg has done well to turn his attention to the modes of prevention rather than of cure. It does not appear that the susceptibility to the action of the poison is great. Hertwig states that of 59 inoculated dogs, only 14 were affected with rabies, or 23 per cent. In 60 authentic cases, the shortest period of incubation was 14 days, the longest 9 months, the medium 4 to 7 weeks. In 17 authentic cases we have transcribed, the shortest period was 3 weeks, the longest 18 weeks, the average 58 days. Trolliet states that of thirteen persons bitten on the same day, by a rabid wolf, hydrophobia appeared in six in from 15 to 30 days, in four in from 30 to 40; in two the period was from 40 to 53, and one exhibited no symptoms for three months and eighteen days. In dogs, the disease, according to Hertwig, appears within 50 days after the bite. Depressing circumstances, especially mental affections, favour the outbreak of the disease. Although the cure of hydrophobia be utterly hopeless, and no antidote has yet been discovered, the prophylaxis is full of hope. Excision of the bitten part is the surest mode of prevention, and scarcely inferior is the destruction of it by caustics; Mr. Youatt advises that the nitrate of silver be used for this purpose; Rust and others recommend the caustic potash. Ligatures and cupping-glasses may be made auxiliaries to these, but should not be trusted alone.

Psychical spasms. We pass the class of motus vertiginosi to notice these, the "imitated movements" of English writers, and on which as well as on the vertiginous affections, animal magnetism may be expected to throw some light. The subject is one of the most important in cerebral physiology, and has a decided bearing on education, morals, and social economy. Epidemic fanaticism, tarantism, the leaping ague of Scotland, and other well-known examples of this kind of disease are mentioned. This imitative propensity appears sometimes as a chronic affection. We have been consulted respecting a girl of five years, who when spoken to, gave no answer, but repeated what was said to her like an echo. Professor Romberg who terms this form "echo," states that he has observed it in many individuals, and in variously diseased states of the brain. A case has been published, in which an adult had irresistibly imitated from early infancy all the muscular movements of individuals about him. If this dotterel-like propensity was forcibly restrained, he complained that his heart and brain were vexed.

Eclampsia parturientum. In this affection Professor Romberg joins with the English and American writers in recommending copious bleed-

ing, opium, and immediate delivery. If the convulsions resist this treatment, counter-irritants to the nuchæ, local depletion, the cold shower-bath, turpentine and assafetida clysters, &c. Dr. Denman's plan of dashing cold water in the face is we think perfectly in accordance with the pathology of the disease. The convulsions are reflex ; they come on while the head of the child is pressing on the os uteri, and commence with the laryngeal muscles. Respiration is suspended, cerebral congestion follows on the cardiac and pulmonary congestion, and then general convulsions supervene.

Puerperal convulsions are comparatively rare. Madame Lachapelle states that they occurred to 68 only of 34,000 parturient females; Mayer had only five cases in 2500; but Merriman had more, 48 in 2000.

Epilepsy. Professor Romberg has furnished a good description and history of epilepsy in all its forms and complications. An interesting case is detailed in which various of these complications occurred in a regular sequence. We think it will interest our readers, especially the physiological and mesmeric, but regret that our notice is already too lengthened to give it in detail. The subject of it was a girl, aged twenty-eight years, has for twelve years been subject to epileptic attacks, (the consequence of a fright,) during which there is a maniacal condition. In the intervals, the lower extremities are partially paralysed, the patient being unable to rise from her seat, or to go scarcely a few steps, even when supported by two persons. She has also for two years been affected with an obstinate quartan. The details, the correctness of which is we think indisputable, affords matter for curious speculation. One inference may be fairly drawn from them, namely, that our knowledge of the functions of the hemispherical ganglia is almost *nil.*

One hundred and fifty quarto pages of Hennen's 'Analecta literaria Epilepsiam Spectantia,' published in 1798, are filled with the remedies for epilepsy. The experience of forty-five years has added to their number ; but probably there are not two of the whole that can be prescribed with any confidence; we shall not therefore review them. Professor Romberg cautions against moderating the convulsions during the attack, or limiting their duration ; the more complete the paroxysm, particularly after a long interval, the greater is the relief of the patient. There is some truth in this. Another caution is necessary. A ligature to a limb, especially if there be an epileptic aura from it, will prevent a paroxysm ; but if the use of the ligature should be forgotten or neglected after having been used awhile, there is a great danger of a fatal accession. Dr. Townsend related a case of this kind to Dr. Graves. The fits were extremely frequent, (five in a night,) and were warded off for four months, by the means of a stick and a cord round the leg. After that period, the patient left off the use of the latter, and died in the first paroxysm.

We have now finished our review of this the first volume of Professor Romberg's work. It is imperfect in several points, as we have shown, but it is not without merit. We feel curious to see the next volume, and learn our author's views on the psychical neuroses. If he be inoculated with the usual metaphysics of the German school, they will not possess much value. Should, however, future neuro-physiological researches be as successful as the past, and these be worked up by our author, his first volume will need rewriting by the time his second is finished.

Art. X.

1. *Traité de Chimie Pathologique, ou Recherches Chimiques, sur les Solides et les Liquides du Corps Humain, dans leur rapports avec la Physiologie et la Pathologie.* Par S. D. L'Heritier.—*Paris*, 1842. 8vo, pp. 744.

A Treatise on Pathological Chemistry, or Chemical Researches on the Solids and Liquids of the Human Body, in their relations to Physiology and Pathology. By S. D. L'Heritier.—*Paris*, 1842.

2. *Lehrbuch der Physiologischen Chemie.* Von Dr. C. G. Lehmann. 1ste Band.—*Leipzig*, 1842. 8vo, pp. 380.

A Treatise on Physiological Chemistry. By Dr. C. G. Lehmann. Vol. I.—*Leipsic*, 1842.

3. *Anleitung zum Gebrauch des Mikroskopes zur Zoochemischen Analyse, und zur Mikroskopisch-chemischen Untersuchung uberhaupt.* Von Dr. Julius Vogel.—*Leipzig*, 1841. 8vo, pp. 600.

Introduction to the use of the Microscope in the Chemical Analysis of Animal Matters, and in Microscopico-chemical inquiries in general. By Dr. Julius Vogel.—*Leipsic*, 1841.

4. *Chemistry of Animal Bodies.* By Thomas Thomson, m.d.—*Edinb.* 1843. 8vo, pp. 702.

The impulse given of late years to the prosecution of animal chemistry by the labours of Berzelius, followed in our own country by the accurate and successful researches of Prout, and in Germany by those of Tiedemann and Gmelin, and more recently by Liebig, among many other eminent names, is amply attested by the succession of works continually issuing from the press on this subject, both in our own and in other countries; and the importance of a careful application of the laws of inorganic chemistry to the study of the more delicate products of organized beings is at length claiming both from chemists and from medical practitioners its due share of attention.

It is hardly necessary, with the admirable practical treatise of Dr. Prout before our eyes, to insist upon the great value of chemical science, carefully and judiciously applied to the prophylaxis and management of disease. Indeed the danger now lies, as is frequently the case where a strong impulse in one direction has been given, in our running into the extreme of attributing more to chemical agency than justly lies within its reach, falling again into the errors of Van Helmont and his contemporaries, and vainly striving to cure all diseases by remedies, if any such there be, whose action is of a strictly chemical nature.*

* When we find an eminent professor attempting to explain the narcotic effects of morphia by its chemical composition, and referring to the same source to account for the febrifuge action of quinine, before we can at all conjecture why oxalate of potash should prove a deadly poison whilst the bicarbonate is comparatively innocuous—two substances which differ from each other only in the fact that the latter contains one equivalent more oxygen than the former—when we find the same chemist explaining the action of tea and coffee by a distant similarity in composition between caffein and taurin, an azotised crystalline principle extracted from the bile, not of man only who takes these articles, but also of herbivorous animals, who do not partake of them; it is pretty evident we are in danger of following the delusive glimmer of an ignis fatuus, in place of the steady light of unchanging truth.

A judicious and discriminating application of well-ascertained chemical facts to the employment of remedies in disease, must evidently prove a most valuable aid in the improvement of our methods of treatment; but we cannot be too cautious in sifting those facts, nor too wary in trying experiments founded upon hypotheses, recommended it may be by novelty, simplicity, and high authority, but which if erroneous might compromise some valuable life. Undue discredit would thus be brought upon science when the fault ought rather to be referred to the unskilful manner in which its principles were applied.

Fruitful as is the field thus opened to us, it can only produce its fruits by the proper cultivation of the soil; and in this, as in all other cases, a certain amount of preliminary knowledge is required before those principles can yield the harvest which under right regulation they may be made to afford. *Physiological* chemistry requires among other things, a thorough acquaintance with animal chemistry in general, in which term we include *comparative animal chemistry*, i.e. the chemistry of different classes of animals, which is no less important to the chemical physiologist than comparative anatomy is essential to the student of microscopic anatomy. Lehmann's observations on this point are so judicious that we cannot avoid quoting them:

"Animal chemistry, (Zoochemie,) that is to say the knowledge of the chemical constituents of the animal body, bears the same relation to physiological chemistry that anatomy does to physiology; without anatomy we cannot conceive the existence of physiology; and equally impossible is a physiological without an animal chemistry. But indispensable as animal chemistry is to the study of chemical processes in the animal body, yet it does not of itself constitute physiological chemistry. It is in itself not sufficient to the necessity, and even of but little service to the physiologist and physician, for it is deficient in its direct relations to physiological and pathological processes. Physiological chemistry first acquires value to the physiologist and physician, when each single chemical substance capable of isolation is considered in its relation to the entire organism, and in its influence on the vital functions, and when each chemical process is better understood in its connexion with the dynamics of the organism." (Pref. p. vii.)

It is equally evident that a sound physiological chemistry must prove the only solid foundation of a rational pathological chemistry, and the latter will of course shed a reflected light upon many unexplained points in the physiological part of the subject. Bearing these facts in mind, we shall be better enabled rightly to estimate the value of the works before us which (particularly the first three) profess to furnish us with facts and observations, more or less extensive, upon the different points connected with the physiology and pathology of the human frame; by thus affording us data whereby theories may be tested, they will prove of essential service to the practical physician.

M. L'Heritier divides his work into eleven chapters. The first, occupying more than a third of the volume, includes a lengthened consideration of the blood and its allied fluids, chyle and lymph. In the next he reviews the chemistry of digestion, and in the third passes to the urinary function in its healthy and diseased conditions. These subjects together occupy three fourths of the work. The remaining chapters are in succession devoted to the adipose, serous, and mucous tissues with their secretions; to the nervous system, external senses, products of the genital

organs, and locomotive apparatus; and the book concludes with a kind of appendix for such morbid products as do not conveniently find their place in the preceding classification.

Dr. Lehmann's work is upon a totally different plan, including pathological points only incidentally as they bear on physiological considerations. After a preliminary sketch of the chemical properties of organized matter, and the principal changes to which it is subject in the processes of fermentation, putrefaction, and decay, he gives a detailed account of the various ingredients, first of an inorganic, and then of an organic nature, which enter into the composition of the animal frame. The organic matters he divides into those essential to the constitution of the body, and those produced in the secretions or excretions. Each substance is considered successively: 1st, in its chemical relations, including its properties, composition, and mode of preparation; and 2dly, in its physiological relations, under which are described the parts of the body in which it occurs, its uses, and its origin. The utility of thus clearly defining the different parts of the subject will be at once appreciated by those who may have occasion to employ this work as a book of reference.

The treatise of Dr. Vogel is again quite different from either of the preceding, and relates, as its title purports, principally to the employment of the microscope in chemical inquiries. The first fourth of the book is occupied with a description of microscopes of various kinds, the theory of their action and the mechanical management which each requires. Then follow directions for the performance of the simplest chemical operations, and descriptions of the requisite apparatus; after which we have a detailed account of the proximate elements which occur in Zoochemical inquiries, the parts of the body in which they occur, physical properties, chemical relations, and analytical methods of determining the quantity in which they may be present.

The inorganic constituents are next briefly described, and directions given for preparing the various necessary reagents. General directions for organic analysis follow. The remaining third of the work is devoted to the application of the microscope to chemical investigations illustrated by examples of various kinds, with directions for preparing and preserving specimens for microscopic examination.

The work of Dr. Thomson is an elaborate compilation from the more recent memoirs on animal chemistry, reducing the subjects of them into a systematic form. It is arranged into three divisions: The first embraces the animal principles, and these are treated without much reference to their origin, under the heads of animal Acids, Bases, Oxides, Colouring matters, and Amides, or chief azotised constituents of the body. The second division of the work includes the solid parts of animals, the liquid parts, and morbid concretions. The third gives a brief review of the principal chemical functions of animals; and an Appendix, contains an account of the methods of ultimate analysis now in use.

As the treatise of L'Heritier is that which bears most directly upon pathology, and therefore presents the most interest to the medical reader, we shall examine it somewhat in detail.

Commencing with the fluids concerned in sanguification, the author

treats first of the *chyle*. Owing to the difficulty of obtaining it for examination even in a healthy state, however desirable such information would be, but little that is new has been done in relation to the analysis of this fluid. If our knowledge of it in a healthy condition is scanty, we are in still greater ignorance of its changes under the influence of disease. Thus much, however, is certain, that the chyle varies with the nature of the food taken, though the precise conditions under which it varies, and the changes produced have not been satisfactorily made out. Its composition closely resembles that of the blood; it is, however, considerably more dilute, and usually contains a much larger proportion of oily matter. Fibrin, albumen, a trace of the colouring matter of the blood, fatty matters *sui generis*, certain ill defined extractive matters, with water and the usual saline constituents of animal fluids, are its chief ingredients. The microscope discovers two distinct kinds of globules, one of which, varying in size and of high refractive power, is formed by fat held in suspension; the others closely resemble the colourless corpuscles of the blood. The amount of fibrin, (recognized by the tendency to spontaneous coagulation, and by the firmness of the coagulum,) increases, as the chyle passes from the walls of the intestinal canal to the thoracic duct; whilst that of oily matter diminishes.

With regard to that closely analogous fluid *lymph*, our knowledge is scarcely more satisfactory or accurate than that which relates to the qualities and composition of chyle; and L'Heritier adds but little to that scanty store. Like the chyle, its composition varies with the part of the system from which it is taken; the nearer it arrives to its point of admixture with the mass of circulating fluid, and the greater the time that has elapsed since taking food, the more concentrated it becomes. It too contains globules, but they are smaller and rounder than those of the chyle. As a large part of the lymphatic system is less deeply seated than the chyliferous, its morbid conditions are more readily appreciated; but our information on this subject remains most vague and unsatisfactory. Dr. Rees has, by a comparative analysis of chyle and lymph in the same animal, (a young ass,) shown that the same animal matters are present in both, but that the chyle contains thrice the proportion of azotised matters furnished by lymph, with a much greater proportion of fat.

Next follows a long and diffuse chapter on the *blood*. We need not dwell upon the question of the vitality of this fluid which is here discussed. The cause of its coagulation is considered at some length, but little is added to our knowledge on the subject: The change is evidently the result of a vital, not a chemical act: chemical agents, therefore, when they destroy vitality, prevent coagulation. The author confirms the previous observation that the feebler the vitality of the animal which furnishes it, the more rapidly, *cæteris paribus*, but less firmly does the blood coagulate.

We pass next to the chemical constituents of the blood. Among the well-ascertained ingredients of this complicated fluid, the following may be enumerated as met with in its healthy state: Albumen; fibrin; red colouring matter; certain fats containing phosphorus; an azotised fat termed serolin; a minute portion of cholesterin; a volatile oily acid varying with the species of the animal, to which the peculiar odour of blood is due; besides a small quantity of oleic and margaric acids in the

form of soap; chlorides, sulphates, lactates,* phosphates and carbonates of soda, potash, lime and magnesia; certain ill-defined, so-called extractive matters; besides free carbonic acid, the presence of which in venous blood, notwithstanding the denial of that fact by many high authorities, is clearly demonstrated by the experiments of Stevens and Magnus. No urea has hitherto been found in healthy blood. Many other substances are mentioned as having been found, but their occurrence in general is more than problematical.

M. L'Heritier cautiously abstains from adopting the opinion that fibrin and albumen are identical, and adduces their physical properties as well as chemical ones, as vouchers for his accuracy. Indeed the solubility of venous fibrin in an alkaline solution of nitre, though a striking experiment, does not amount to much in the way of proof, for it certainly is not equivalent, as some have supposed, to a conversion of fibrin into albumen, though in many of its reactions this liquid resembles a solution of albumen.

"It is indeed," remarks he, "of little consequence whether we regard fibrin and albumen as distinct and separate principles, or simply as modifications of the same principle. There is no doubt their offices in the economy are perfectly distinct, and it is probable the substances themselves are so likewise." (p. 74.)

The analytical researches of Dumas on the composition of these bodies, published since M. L'Heritier's treatise, tend to strengthen this opinion; as by numerous careful experiments, this distinguished philosopher found albumen invariably to contain more carbon and less nitrogen than fibrin. In one remarkable particular, fibrin, as Scherer and Mulder have shown, differs from albumen, viz., in its superior tendency to absorb *oxygen.* This absorption occurs rapidly when fibrin, whether in solution or in the solid state, is exposed to the air, whilst with albumen the alteration for a long time is scarcely perceptible. Doubtless this difference is intimately connected with the different share each of these principles takes in the processes of respiration, and the production of animal heat.

M. L'Heritier then proceeds with a detailed description of the physical and chemical properties of the more important constituents of the blood, which, as being recently noticed in this Journal, (review of Andral, in Number XXXIII,) we need not here repeat.

With regard to the changes of colour that the blood undergoes during respiration, he is a strong partisan of the opinion that "the salts contained in the blood are the true cause of the passage of the colouring matter from black to red, and consequently of the scarlet colour of arterial blood," (p. 96,) adopting Dr. Stevens's views, without mentioning his name.

The manner in which the oxygen of the atmosphere penetrates the parietes of the blood-vessels of the lungs, and is thus admitted to act upon the fluid they contain, would be more correctly explained, as Professor Daniell has shown in his 'Introduction to the study of Chemical

* Dr. Enderlin has recently published a paper in Liebig's 'Annalen der Chemie u. Pharmacie,' bd. xlvi, s. 164, in which he states that after a careful examination of considerable quantities of blood from herbivorous animals, he was quite unable to detect even a trace of lactic acid or of its salts. If this observation be confirmed and extended to the human species, the theories respecting the important part played by these compounds in the economy crumble to the dust.

Philosophy,' by the variation in the force of adhesion between the membranes, the different gases and the fluids which permeate the tissues, a result which Dutrochet, without sufficient foundation, considers to be due to the action of new forces. The results he designates conveniently enough by the terms *endosmosis* and *exosmosis*, indicating the mutual change of places effected between gases or liquids through the medium of a porous diaphragm; a process of high importance in the economy of organized nature. Some, however, have attributed effects to it to which it certainly can lay no claim. Thus, Liebig supposes air may pass directly from the stomach into the lungs. After speaking of the air which is carried down by the saliva, he says, "no doubt a part of these gases may enter the venous circulation through the absorbent and lymphatic vessels, and thus reach the lungs where they are exhaled, but the presence of membranes does not offer the slightest obstacle to their passing directly into the cavity of the chest." In another place, speaking of carbonic acid developed in undue quantity in the stomach, he says "the carbonic acid which is disengaged, penetrates through the parietes of the stomach through the diaphragm, and through all the intervening membranes into the air-cells of the lungs, out of which it displaces the atmospherical air." Surely this is carrying a convenient theory a little too far, to make carbonic acid pour into the lungs out of the stomach, as rapidly as from a brewer's vat into the store-rooms beneath, despite the intervention of stomach, peritoneum, diaphragm, pleura and all! During the process of respiration, nitrogen as well as oxygen is absorbed, and probably this is one source of the nitrogen exhaled by the skin. The nitrogen appears to undergo no chemical change, but is merely mechanically taken into the system from its solubility. Ordinary experiments do not discover this absorption; for if the blood be, as it usually is, saturated with nitrogen, the amount absorbed will equal that which is evolved, but by making animals breathe in a mixture of oxygen and hydrogen, nitrogen is always found in the respired air, being displaced from the blood by hydrogen. Carbonic acid and nitrogen are not the only substances thrown off by the lungs. It is well known that alcohol and many volatile and odoriferous bodies are excreted unchanged from the bronchial membrane during respiration.

We pass next to the methods of analysing the blood. The first plan described is that employed by M. Lecanu; it has less pretension, and is fully as accurate as the tediously minute process employed by M. Denis, which is quoted at full length from that writer. The following method is recommended by L'Heritier as being less elaborate, and therefore more practicable:

"We begin by determining the proportion of fibrin by whipping up a given quantity of blood on its issue from the vein; this done, we dry over the water-bath a known weight of the same blood, and weigh the residue to determine the quantity of water. In conducting this operation, care must be taken to preclude the admixture of dust suspended in the air or of any other foreign matters, by means of a gauze cover. Having exhausted the residue by ether, and boiling alcohol to separate fatty matters, we proceed to incineration in order to determine the proportion of oxide of iron which the ashes contain. This quantity once known, it is easy to deduce from it the amount of the hematosin contained in the blood, since Lecanu has demonstrated that the proportion of iron in the same quantity

of hematosin is constantly the same. The proportion of this latter being determined, we may imagine the weight of the globules to be proportional to this quantity. We might also try whether the serum and fibrin contained traces of iron, and deduct this from the general sum. If we wish to estimate the proportion of albumen contained in the serum, we must coagulate a given quantity of it by heat; wash, dry, and weigh the coagulum." (p. 113.)

We will not say that M. L'Heritier has never practised his own process, but we do not hesitate to assert that the method here recommended for ascertaining the amount of red particles is quite inadequate to the purpose, as, according to the analysis of Denis, 1000 parts of human blood contain only 0·195 parts of oxide of iron, a quantity so minute that the errors inseparable from experiment would deprive any calculation of the quantity of the globules founded upon it of any scientific or practical utility. Moreover, the facts which this method of analysis furnishes are so meager as to be almost valueless. For all practical purposes the plan followed by Lecanu with the slight modifications adopted by Andral and Gavarret, is by far the best that has hitherto been proposed. The quantities operated upon in Simon's process are too small, and larger cannot safely be used. Our author next relates some experiments to ascertain the variation in composition of the blood taken from different parts of the same animal. His results confirm those previously obtained by Thackrah and Schultz, detailed by Mr. Ancell in his elaborate Lectures on the Pathology of the Animal Fluids, published in the 'Lancet' for 1840, and which contain an excellent digest of most that is known on these subjects. In five comparative experiments, M. L'Heritier found that the blood of the jugular constantly presented a *larger proportion* of saline matter than that of the vena cava, the *blood of the* portal vein compared with that of the jugular, contained, in five experiments, a considerably larger proportion of serum, and coagulated more rapidly. From portal blood he obtained by analysis less fibrin and fewer red particles. According to Schultz, the same blood furnishes nearly double the usual amount of fat. By experiments quoted from Denis, placental blood contains more red globules and less water than ordinary venous blood. The author adds nothing satisfactory to our knowledge of the difference between venous and arterial blood; the only fact ascertained with certainty appears to be that a larger proportion of carbonic acid exists in the former. The subject requires reinvestigation and careful elucidation by comparative experiments.

A good review follows of the processes by which animal heat is generated, though the facts and reasonings adduced are such as have been long familiar to chemists: he draws the conclusion that the "principal cause of calorification resides in the combinations effected between the elements of the blood and the oxygen absorbed during the respiratory act, or disengaged in the texture (trame), the matrix as it were of the tissues, as a consequence and by virtue of the molecular reactions which constitute nutrition." (p. 136.)

Among other subjects reviewed by Liebig in his work on 'Animal Physiology,' the generation of animal heat has been treated at considerable length, and the conclusion he arrives at is that the chemical actions going on within the body are the *sole* source of the heat evolved;

an opinion supported by Dumas and other eminent men*—but it is not to combination alone with free oxygen that Liebig limits the source of heat; it is not simply to the union of atmospheric oxygen with the constituents of the tissues. He maintains that the transfer of *oxygen in combination* from one substance to another, is an important aid: *e. g.* in the conversion of the amylaceous or saccharine principle into fat, which is effected by the abstraction of oxygen from the elements of which it is composed. The oxygen abstracted in this process he imagines to be transferred to other compounds in the economy and during this act of transfer to give out heat; so that the *deposition of fat*, as well as its *absorption*, is a source of heat; a convenient method of turning oxygen to account under exactly opposite circumstances. We usually find that if bodies in *combining* give out heat, they on *separating* from such compounds absorb it again. If during the transfer oxygen evolve heat on uniting with a second body, whence could it obtain that heat but by absorbing it at the moment of separation from the body with which it was previously in combination. Dumas even denies the production of fat by animals; and then, of course, Liebig's theory and the objections to it fall to the ground. This eminent chemist has, however, demonstrated clearly that Dumas in his zeal to prove that all the proximate elements of the animal body are derived from the vegetable kingdom, has fallen into error; and that the generation of fat from bodies which do not contain it, is usually effected by the assimilating process, though there are instances in which it may be otherwise. We shall only briefly notice that portion of M. L'Heritier's work which relates to the important subject of the variations which the different constituents of the blood undergo during disease, as in our last Number we particularly directed the attention of our readers to these points, in the review of M. Andral's work.

The *watery part* of the blood appears to diminish in full plethoric habits, in inflammatory diseases, and especially in patients suffering from Asiatic cholera. In anemia and in hemorrhagic affections, it is increased.

Albumen, except in Bright's disease, where it is diminished, although subject to great variation, does not appear to follow any general rule. For more extended information on this point, as well as for details of the circumstances which modify the proportion of *fibrin*, the reader is referred to the article already alluded to. We cannot, however, altogether omit the recent important researches of Mulder on the buffy coat of the blood. Bouchardat imagined he had extracted gelatin from the inflammatory crust, especially in cases of rheumatism, by long-

* Whatever theory it may be fashionable to adopt, in order to explain the generation of animal heat, facts must not be disregarded, merely because they militate against that theory. The reader is therefore reminded of Chossat's remarkable experiment, in which, after dividing the spinal cord in animals, the temperature underwent a considerable elevation, an observation the accuracy of which was confirmed by Sir B. Brodie on repeating the experiment, and still further illustrated by a case reported by this eminent surgeon, in which, after severe injury to the upper part of the spinal cord, he observed in articulo mortis, when diaphragmatic respiration had continued only three or four times per minute for a considerable period, that a thermometer placed on the inside of the thigh attained the almost unexampled temperature of 111° F., where, with a very much diminished supply of oxygen, the heat far exceeded the normal standard.

continued boiling. This Mulder has shown to be an error, and has demonstrated by careful analysis, that what Bouchardat mistook for gelatin was a product of the decomposition of protein, and which has an elementary composition totally different from that of gelatin. He has further shown that the crust of inflamed blood consists not entirely of pure fibrin, but principally of this soluble substance which he calls tritoxide of protein, composed of C. 40, H. 31, N. 5, O. 15 + aq., which may be extracted by boiling, and of another substance insoluble in water, having the composition of deutoxide of protein, C. 40, H. 31, N. 5, O. 14. The quantity of *fatty matter* also varies, but according to no general rule; Simon, however, finds from numerous careful analyses that in inflammatory affections the quantity is sensibly increased, and usually in proportion to the increase of fibrin. The *salts* of the blood are observed specially to diminish during an attack of Asiatic cholera, and in the later stages of severe fevers.

The *red globules* appear to be the ingredients most subject to variation; and on this point our author confirms the observations of Andral. He finds that they are generally increased in plethoric persons, and in febrile attacks, and diminished in acute inflammatory affections, in anemia and chlorosis, and in all cases where imperfect nutrition or frequent loss of blood either by the lancet or otherwise has occurred.

We shall close this part of our subject with a few remarks on the state of the blood in one or two particular diseases.

The account of the blood furnished by our author in *morbus Brightii*, is incomplete, and considerably behind the knowledge we possess on the subject, thanks to the labours of Christison, Babington, and others of our fellow-countrymen.

The excellent researches of Bouchardat have at length settled the long-disputed question as to whether sugar exists in the blood in *diabetes*. He has shown that the quantity is greatest an hour or two after taking food, and that it gradually diminishes by continual elimination through the kidneys, so that if the patient fast for several hours, it almost entirely disappears. Diabetic blood coagulates loosely, is watery, and contains a smaller proportion of fibrin and red globules.

In *Jaundice*, the serum usually becomes coloured by the colouring matter of the bile, but the essential constituents of the secretion have not been found in it.

"The blood of jaundiced patients differs from the blood of other individuals, principally by the disagreeable taste of the serosity, and by the saffron colour of the latter, which becomes canary yellow when diluted with water. In jaundice coinciding with some inflammatory affection of the liver, of the lungs, &c. &c., not only the serosity is very deeply coloured, but the coagulum also presents a buffy crust tinged with yellow." (p. 238.)

In *tuberculous and cancerous* affections, the blood presents what Burdach has termed the albuminous diathesis. "Assimilation is abundant but incomplete, and it is marked by vermilion-coloured viscous blood, deficient in fibrin." (p. 261.) It coagulates therefore feebly and loosely, though sometimes it presents the coat,—the globules and saline matter are diminished in quantity, and the water increased.

In a solitary instance of *gout*, our author found urea distinctly in the blood, and as the proportion of uric acid in the urine increased, that of the urea in the blood diminished.

The aqueous portion of the blood in *cholera* is greatly lessened, so that the quantity of solid matters is in some cases nearly doubled. The salts, and particularly the alkaline carbonates, are also much smaller in quantity; urea is almost universally present, and the fluid is black and has a tarry consistence.

Lecanu found that in *endocarditis* and *pericarditis*, the globules were diminished and watery portion increased,

Of the state of the blood in *syphilis*, little is known, as an opportunity is seldom afforded of examining it uncomplicated by the action of remedies. In secondary syphilis our author found a considerable diminution of the globules, and a remarkable irregularity in their form.

A peculiar *milky appearance* of the blood has now and then been observed due to the presence of an extraordinary quantity of fat in this fluid, which has been found to constitute from three to five per cent. of the serum. The serum of this blood is less dense than usual, and contains less albumen than the normal quantity.

On the effects of certain remedial and poisonous agents upon the blood, the information we possess is still less precise or extensive. Our author devotes a short section to this subject. He makes the following remarks upon poisoning with carbonic acid:

"The researches which I have published upon this species of asphyxia have conducted me to results entirely opposed to those which authors up to that period had described; thus, whilst all agree in saying that the venous blood of subjects asphyxiated by the vapour of charcoal is of a dark black, I have always found it rosy or cherry red. The small veins which ramify under the skin of the animals experimented upon (rabbits) presented themselves under the form of ramifications of a pale rose colour. I believe the contradiction which exists between my observations, and those of my predecessors is to be explained by the rapidity with which the asphyxia supervenes, and especially by the period at which the examination, post mortem, is performed. When it is deferred, the blood which at first was a bright rose colour, assumes a bluish tint. In animals which are opened immediately after death, this phenomenon is very remarkable: immediately the intestinal mass comes into contact with the air, the vessels which traverse it lose their bright rose tint, and become livid; the same occurs with the intestines themselves, and with the mesentery. From these remarks I have concluded that asphyxia from charcoal is not a *negative asphyxia*, as has been said, but truly an asphyxia with poisoning of the blood." (p. 278.)

It has been long well known that carbonic acid does not produce poisoning by negative asphyxia; animals allowed to breathe common air but confined in a bladder, so that the whole surface of the body except the head is exposed to an atmosphere of carbonic acid, quickly perish, with all the signs of asphyxia from the gas.

In a variety of cases of poisoning the blood is evidently materially altered in appearance, consistence, and smell, although, from the want of chemical analysis, our information is devoid of all scientific precision. Although oxalic and hydrocyanic acids have never been found in the blood by chemical tests, yet the poisoning of leeches applied to the body in these cases lends some probability to the opinion that they exist as such in that fluid.

We pass now to the second chapter, comprising "the products of secretion, which concur to digestion, the products of digestion, and the digestive tube, with its adjuncts."

Saliva. This fluid is, in health, generally slightly alkaline, though during dyspepsia, febrile and inflammatory affections, and in malignant diseases of the stomach, it generally assumes an acid character. Among its constituents M. L'Heritier enumerates water, salivary matter or ptyalin, ozmazome, [?] with lactate of soda, mucus, chloride of sodium, phosphate of lime, and silica. He considers as problematical the presence of sulphocyanic acid announced by Gmelin; we have had, however, frequent occasion to prove its presence; and the elaborate experiments of Dr. Wright, in his excellent examination of the saliva, have shown that the quantity of sulphocyanides is increased by the exhibition of free sulphur. We have but few chemical analyses of the saliva in disease, and those few relate principally to the proportion of water and solid matters. Healthy saliva contains on an average 98·65 water, 1·26 of organic matters, and 0·09 of fixed saline matters, according to M. L'Heritier. In mercurial salivation the mucus is increased, the salts and ptyalin remain the same. The composition of healthy saliva is, however, very variable, as the proportion of solid matters may be diminished one half without any deviation from health. In diabetes sugar is occasionally present in the saliva, and in Bright's disease urea has been detected in it. Lehmann (p. 286) states that in cases of diabetes he has found lactic acid, in its free state, in the saliva, and that he believes its acidity is a very constant symptom.

We find little that is new in relation to the *gastric juice*, excepting that our author disputes the important part performed by pepsin in the act of digestion, and erroneously attributes to all mucus mingled with acids a similar power. As is well known this fluid, when the stomach is empty, is small in quantity and nearly neutral; if the viscus be irritated by the presence of food or by any stimulus, it becomes acid. The *intestinal secretions* are briefly described in the following words:

> "The part of the digestive tube described under the term intestines, is also lubricated by a liquid which contributes, like the gastric juice, to the digestion of the aliments taken. This juice, neutral when the viscera are empty, becomes acid and more abundant during digestion, especially in the jejunum. In the large intestine, on the contrary, except in the cæcum, it is feebly alkaline. The impossibility of procuring this liquid in a state of purity is the reason that we have no accurate analysis of it." (p. 315.)

The nature of the acid of the gastric juice has been the subject of much dispute. Dr. Prout found it to be principally hydrochloric acid, a result confirmed by Tiedemann and Gmelin, who found likewise a variable proportion of lactic acid, which is considered by Dr. Prout, however, as a morbid product.

Pancreatic secretion. On this subject, the experiments of Tiedemann and Gmelin are quoted, but nothing new is added.

Bile. The elaborate analysis of the bile by Gmelin is also detailed, but our author judiciously remarks that a great number of the substances obtained by this chemist are doubtless the result of operations performed in the laboratory, an opinion abundantly confirmed by the recent researches of Berzelius. According to this celebrated chemist, ox-bile consists of the following substances: 1, mainly of a peculiar resinoid substance termed by him *bilin*, which is the most characteristic constituent of the fluid, (a substance which Liebig considers a resinous acid in combination with soda,)

with a small portion of a resinous acid, the bili-fellinic; 2, mucus of the gall-bladder; 3, a peculiar colouring matter, identical in properties with chlorophyll, (the green colouring matter of the leaves of plants), and like it susceptible of three distinct varieties, of which the green and the brown are of frequent occurrence; 4, small quantities of fatty acids, (the stearic, margaric, and oleic;) 5, a minute portion of cholesterin not exceeding $\frac{1}{10,000}$; besides, 6, free soda and phosphates, chlorides, and sulphates of soda, potash, and lime. From the facility with which the bilin undergoes change, and from the complex nature of the secretion, notwithstanding the numerous researches of which it has been the subject, our knowledge of it even in the healthy state is very imperfect, and although liable to numerous and important changes in disease, our information respecting the chemical alterations it undergoes is limited and deficient. Of the uses of the bile we are almost as ignorant as of its chemical composition. Tiedemann and Gmelin have given the most probable explanation of one of its chief objects, viz., a means of separating the superfluous hydrogen and carbon from the system, that the lungs may not be over-burdened. In some of the lower animals, as the doris and tethys, the gall-duct opens close to the anal aperture, and we find in hot weather and in hot climates, where the respiratory function becomes more sluggish, that the liver shows greater activity, and, from the increased share of duty that falls upon it, is liable to enlargement and disease. Liebig, however, has started the hypothesis that the bile is principally subservient to respiration, and that the chief office of the liver is to generate a material for the support of animal heat. All the facts with which we are acquainted, the considerable proportion of bile in the excretions, (though this is denied boldly by Liebig,) the history of diseases of the liver, the anatomical peculiarities of the doris and tethys, &c. &c., militate so strongly against this view, that it probably would never have obtained credit but from the high authority whence it emanated. It is to be observed that bile is never found in healthy blood. Simon has shown that a very small quantity causes destruction of the blood-globules, and it is doubtful, even in disease, whether more than the colouring matter has ever been certainly proved to be present, except, perhaps, in those remarkable cases of jaundice, whose pathology was first elucidated by Dr. Alison, in which death rapidly supervenes from the accumulation of *all* the elements of the biliary excretion in the blood, owing to a complete suspension of the secreting process. Our knowledge of the morbid alterations of the bile is scanty and deficient in precision. Thus it varies greatly in *colour*, being green in the diarrhœa of infants and black in yellow fever (?) in *consistence*, being much less aqueous than usual in cholera; and in *quantity*. Some interesting remarks are given on the connexion between the skin, lungs, and liver, for which our readers are referred to the treatise itself; the chapter well merits perusal.

Next follows a section on the act of digestion. As, however, it is a mere recapitulation of facts already systematized in various treatises on physiology, it need not here detain us.

Products of digestion. The chyle having been already described, the feculent matters are first considered. These amount, on an average, to 6 oz. daily, three quarters of which are dissipated by desiccation; about thirty grains of the residue are biliary matter, according to the analysis of

Berzelius. They are estimated at from 1-11th to 1-20th of the food, solid and liquid together, or at 1-7th or 1-8th of the solids taken. Generally speaking, unless abounding in bile, they are neutral in their action on test paper. The composition of these excretions varies with almost every malady, and the appearance, odour, colour, and consistence, betoken important changes, with which every practitioner is familiar; dependent upon the superabundance or deficiency of the bile, the greater or less amount of the mucous secretion of the intestines, the nature of the ingesta, &c. &c. But little, for obvious reasons, has been effected in the way of chemical analysis. Simon has recently published a recapitulation of what has been done by different authors as well as by himself. He found the solid parts of the *meconium* to contain after desiccation as much as 16 per cent. of cholesterin in crystals, besides a large quantity of bili-fellinic acid. In a case of cholera, he found but little albumen in the stools, which contain 98 per cent. of water and 1·3 of inorganic salts. Mr. Ancell, on the authority of Dr. Ainslie, states the alvine evacuations in this disease to be strongly alkaline, white, fluid, flaky, and containing the salts of the blood. Other observers have found sugar in the fæces of patients suffering from diabetes mellitus, and it is doubtless for want of examination alone that numerous other important alterations have escaped notice.

We come next to the results of some interesting observations on the gases of the intestinal canal. These have been found to vary according as they are examined, higher or lower in the alimentary tube. Thus in the stomach in health three quarters consist of nitrogen, the remainder of oxygen, hydrogen, and carbonic acid; the principal part being evidently due to the air swallowed. In the intestines, hydrogen, sulphuretted hydrogen, carbonic acid, and nitrogen occur in varying proportions; part of these gases are derived from the decomposition of the food, and part, there is little doubt, from a process of actual secretion, as in many cases of hysterical flatulence. Some experiments of M. Chevillot, combined with those of the author, on the proportion of the different gases in morbid and other circumstances, are detailed at length. Carbonic acid appears to be most abundant in persons suffering from acute and pulmonic affections.

"Subjects who have sunk principally under phthisis yield generally little or no hydrogen, and that this gas is found especially in those subjects who have died of acute diseases or of affections of the digestive system. The nature of the food or medicines administered to the patients appears to us to have great influence upon the production of hydrogen, but the difficulty of appreciating it on account of the variety of food and of the medicines, causes it to be difficult to give an account of it." After detailing some experiments, he says, "Hence we may, perhaps, conclude, that in general the vegetable acids, spirituous or ethereal liquors oppose the development of hydrogen, or at least produce very little of it. ...... This gas is generally more abundant in the small intestines than in the stomach and large intestines." (p. 386.)

Next follows a short chapter, containing the results of analyses of the *liver* and *pancreas*. The analysis of the *glands* is a subject replete with interest, and well worthy of accurate investigation, as it bears directly upon the important process of secretion, and more particularly upon a theory which is gaining ground among physiologists, and which has been ably developed by Mr. Bowman, in his article on Mucous Membrane, in

one of the late numbers of the 'Cyclopædia of Anatomy and Physiology.' Our information on the subject is, however, meager. In an analysis of a healthy liver, by Braconnot, we find 18·94 of parenchyma, 25·56 of soluble matter, and 55·5 of water; of the soluble matter 3·8 per cent. was fat, and 20·19 albumen; no biliary resin is mentioned. Vauquelin found in fatty degeneration of the liver 45 per cent. of semi-solid saponifiable fat, only 36 of water, and 19 of parenchyma.

In the analysis of the pancreas and salivary glands nothing worthy of comment is found.

Urine. The third chapter is devoted to the Urine and Kidneys.

As, however, the attention of our readers has been very recently called to this subject in the analysis of Becquerel's valuable treatise on the 'Semeiology of the Urine,' of which our author has made copious extracts and abundant use, our observations upon this head will be principally supplementary to those already referred to.

In consequence of the variation, in composition of the urine at different times according to the longer or shorter period that has elapsed since taking food, our author recommends the adoption of Chossat's suggestion, employed so successfully by Lecanu and Becquerel, of collecting the urine of the whole twenty-four hours, and experimenting upon the mingled mass. As Becquerel's tables for the density and solid contents of the urine are quoted at length, it is necessary for us to caution the reader against their too ready adoption, as though Becquerel's tables are accurate for saline solutions, the one furnished by Dr. Henry is much nearer the truth for organic matters, especially in cases of diabetes, to which it professes alone to refer. The mean density of the urine is variously stated by different writers. The following precautions are quoted from Becquerel:

"To obtain approximatively the mean density of the urine, it is necessary always at the same time to give the quantity of urine passed, and thus placing these two elements together, that is to say the density and the quantity of the water, we have averages sufficiently exact, and we give an explanation of the differences found by authors in the appreciation of the density of urine in a state of health." (p. 411.)

The mean quantity of water and solids found by L'Heritier scarcely varies from that of Becquerel; for in twenty analyses taken indiscriminately from either sex, he found the solids to range between 506 and 618 grains. It is worthy of notice that when the quantity of water is increased, as by copious draughts of pure water, the proportion of solid matters, even in health, is increased, though by no means in a ratio corresponding with that of the water evacuated. These solids of the urine consist of

"Urea, uric or lithic acid, lactic acid, acetic and butyric acid, urobenzoic acid, lactate of ammonia, ozmazome, extractive matter soluble in water only, vesical mucus, sulphate of potash, sulphate of soda, phosphate of soda, phosphate of ammonia, chloride of sodium, muriate of ammonia, phosphates of lime and magnesia, colouring oil, a little fatty matter and debris of epithelium. The urates are excluded from the constituents of the urine in opposition to the opinion of Prout; it is however probable that they exist in this liquid, but in very small quantity." (p. 423.)

Upon the changes the urine undergoes in disease, we have little to add to the numerous and careful investigations of M. A. Becquerel.

According to this author, the *urea* in health may vary in the twenty-four hours from 222 to 278 grains, on the average, which, however, is greatly influenced by the diet of the patient. M. Lehmann has given us some experiments upon his own person bearing directly upon this point. He, however, always found a larger quantity of urea in his urine than that indicated by almost all other chemists. After taking nothing but hard boiled eggs for three successive days, he found the quantity of urea he excreted daily increased from 505 grains to 821·5 grains; during a vegetable diet it diminished proportionately.

After some directions on the analysis of the urine, a detailed and rather diffuse account is given of the various substances not normally present in this secretion, which occasionally find their way into it, embracing the methods of chemically detecting their presence, and their value to us in guiding or assisting our diagnosis.

Blood often occurs in the urine, both in local affections, such as calculus, and in constitutional diseases, as scurvy and fever. Its presence is recognized by the colour and the appearance of globules when examined by the microscope. Lecanu's process for chemically detecting its occurrence, is given as follows:

"The urine, previously saturated with a little nitric acid, if it be ammoniacal, is raised to ebullition; the coagulum formed is collected on a filter, and treated on the filter itself, if it cannot be detached from it, with alcohol acidulated with sulphuric acid; it becomes decolorized whilst the liquor takes a brown tint which passes to a lively red by a slight excess of ammonia. On evaporating the alcoholic solution, the colouring principle is collected on the surface of the liquid under the form of a black matter of resinoid aspect, soluble in acetic ether and in ammoniated alcohol, to which it communicates a red colour, and which gives with muriatic acid a yellow solution precipitated blue by the addition of ferrocyanide of potassium. The red matter of the blood is thus completely characterized by its peculiar properties and by the reaction of the iron which it contains." (p. 469.)

Albumen may occur in urine which is acid, alkaline, or neutral, and when its presence continues for any length of time it always indicates serious disease, most generally congestion, inflammation, or granular disease of the kidneys. It may occur also after chronic affections of the heart and liver; and it has even been observed in chlorosis, anemia, and scurvy.

"This phenomenon coincides most commonly with the presence of pus, of blood, of semen, &c. in this liquid; with asthma, certain diseases of the heart and of the liver; with an acute febrile disease; with a non-febrile disease accompanied by great functional disorder; with a considerable number of dropsies; with various organic or functional alterations of the kidneys; and finally with a general alteration of the circulating fluid.......... As to the presence of albumen in the urine, considered as an element of diagnosis, it is doubtless of great value; but we must at the same time pay attention to the other modifications which this liquid may have undergone. Thus in Bright's disease, the urine is albuminous, of small density, slightly charged with urea, uric acid, and salts; in some acute diseases, on the contrary, albumen shows itself in a transient way, but the specific gravity of the liquid is considerable, and there is an excess of uric acid and saline matters.

"Urine which is at the same time albuminous and sanguinolent, indicates for the most part hemorrhage from the urinary passages, fungus, cancer of the kid-

neys or calculous pyelitis. That which is at the same time loaded with albumen and with mucus, is almost always connected with chronic inflammation of the bladder, of the ureters, of the pelvis, or calices of the kidney: finally, purulent and albuminous urine constitutes a common symptom in chronic pyelitis, renal calculi, abscess of the prostate or of the neighbouring parts, &c." (p. 477.)

A peculiar *viscous urine* has been met with, of spermatic odour, which contained a substance resembling albumen, fibrin, and mucus, in its proportions, but which corresponded exactly with none of these substances. In *chylous urine* a gelatinous coagulum, of variable size and consistence, indicates the nature of the disease.

"Urine of this nature, it is said, for I have never observed it, may be recognized by its containing *globules*, (analogous to those of the blood, but smaller, and colourless or pink, soluble in acetic acid,) albumen, imperfect fibrin, and a certain quantity of fatty matter." (p. 479.)

An observation of Dr. Prout's that fibrin may occur in the urine in sufficient quantity for the liquid to form a solid mass, is disposed of in a very cavalier manner: "I am not aware that this *opinion* [*!*] has been confirmed by other experimenters, and I *doubt* if it ever is so."! (p. 478). A mere *doubt* of M. L'Heritier's against an *observation* of one of the most accurate philosophers and experimenters that ever lived,—savours something of presumption; and we may be permitted to *doubt* whether M. L'Heritier's experience be quite as extensive as that of Dr. Prout, especially as he admits that *he has never seen* a case of chylous urine. The occurrence of *milk*, or its characteristic principle, *casein*, has never been satisfactorily proved, though often asserted.

Kejestein. This term was given by M. Nauche to a film he observed on the morning urine of pregnant women, after allowing it to stand undisturbed twenty-four or forty-eight hours. He considers it an infallible test of the existence of pregnancy, but has not examined it minutely. Dr. Golding Bird has made some experiments upon the subject, but the most complete account of its properties is given by Lehmann at p. 252; part of his description we here quote:

"By observation of the urine of a woman from the first to the seventh month of pregnancy, I found the urine of a dirty yellow, and more disposed to froth than usual; it generally became turbid in from two to six hours; upon the morning urine, at the expiration of thirty-six or forty-eight hours, a grayish white film always appeared which, often in from two to three days, sank down upon the sediment formed from the commencement of the turbidity. I always succeeded in extracting by ether no inconsiderable quantity of a semi-solid fat, which when saponified by potash and decomposed by sulphuric acid, emitted a most decided odour of butyric acid." [The residue of the film insoluble in ether showed by experiments which it is unnecessary to detail, that it was a protein compound differing in properties from albumen.] "From the foregoing experiments," remarks M. Lehmann, "we may conclude with certainty, that Nauche's kejestein is no new peculiar substance, and nothing more than a mixture of butyraceous fat, phosphate of magnesia, and a protein compound resembling casein."

The *spermatic liquor* can only be satisfactorily demonstrated in urine by examining the deposit from the fluid by means of the microscope; the existence of the spermatozoa then shows its presence without doubt.

Urine which contains *pus* is always more or less opaline, and in the course of a few hours, at the latest, deposits a yellowish or whitish

stratum, which by agitation is easily suspended in the liquid. Heat and nitric acid cause coagulation from the albumen pus always contains; alkalies convert the deposit into a ropy, gelatinous liquid. Purulent urine quickly becomes ammoniacal, and hence undergoes a change by which the pus is converted into a tenacious glairy mass resembling mucus. In fact, Dr. Babington, by agitating pus with a solution of common salt and muriate of ammonia, and allowing it to stand some time, then adding a little free soda, and passing carbonic acid gas through the liquid to saturate the alkali, obtained a tenacious glairy fluid, which coagulated with acetic acid, and which he was quite unable to distinguish from genuine mucus.

"Microscopic inspection permits us to discover in the deposits of purulent urine globules more voluminous than those of those of the blood, reunited into a mass one over the other, and so confused and nebulous, that it is impossible to distinguish them exactly except upon the borders of the mass. But we should have a very incomplete idea of these corpuscles if our examination terminated here. Generally we place under the lens a drop of the layer of urine immediately above the purulent deposit. Here we perceive globules separated or reunited in groups, of variable size and opacity, rounded, with borders more or less regular, having a whitish granular surface, dependent, according to M. Vigla, upon a certain number of small grayish grains contained in these globules. These little bodies have not always the regularity here assigned to them; the more alkaline the urine becomes the more misshapen they become, and the more does their circumference appear notched; some are even reduced to half, a third, or a fourth of their size, a circumstance which helps to give them very extraordinary outlines." (p. 487.)

Our author gives a singular case from his own practice of apparent absorption of pus from an abscess, and its evacuation from the bladder with the urine:

"A woman named Delage, enrolled among the number of the poor in my division, sent for me on the 18th of September last; she complained of acute pain caused by a tumour which had formed during the last three days below the scapula about an inch from its inferior angle. The examination of this tumour immediately convinced me that it was formed by a purulent collection. Indeed a small puncture was followed by an abundant flow of laudable pus; I closed the incision with adhesive plaster, and ordered emollient applications. Two days afterwards a fresh accumulation of pus had taken place in the sac, and as I was preparing again to empty it by puncture, the patient, aged 86 years, entreated me not to use the instrument upon her again. The great age of the woman induced me to pay attention to her request; and I consented to exchange my lancet for caustic potash. I caused a piece the size of a pea to be applied to the tumour; twelve hours after, the tumour had completely disappeared; not because it had been opened by the caustic, not that it had emptied itself by the small incision I first made, and which had closed; but truly by absorption. During the night, fever had occurred, *the urine showed itself turbid and sedimentous;* I analysed it, and *found a matter to which it was easy for me to attach all the characters of pus.*" (p. 489.)

The colouring matter of the *bile* is discovered in urine by the more or less intense yellow tinge it communicates to the fluid or to linen stained with it. Nitric acid which causes it to pass to green, or reddish brown if in excess, has been proposed as a test for it; it is not infallible, and is seldom necessary. If employed, it is best, as Berzelius proposes, to evaporate the urine to dryness, treat with alcohol, evaporate this tincture to dryness, and then add nitric acid.

Sugar is pathognomonic of diabetes mellitus; its presence is best detected by fermentation with yeast, and if a given weight of urine with yeast be inverted in a graduated jar over mercury, the quantity of sugar may be determined with considerable accuracy by estimating the quantity of gas evolved, taking the necessary precautions to ensure exactness.

A variety of substances given as medicines pass into the urine, and may be recognized in the secretions; among those well ascertained are iodide, cyanide, ferrocyanide and sulphocyanide of potassium, sulphates of potash, soda, and magnesia, tannin, indigo, and quinine—various colouring and odorous principles. Many medicines are acted on by the economy, and pass out by the urine, having undergone change in the transit. Thus benzoic acid is separated as hippuric acid, and many salts of the vegetable acids as the *tartrate* and *citrate* of potash, occasion the presence of *carbonate* of potash abundantly in the urine. It is doubtful whether iron, mercury, arsenic, and antimony do pass into the urine; it is most probable that they do not.

Clouds and *sediments* from the urine are classed by our author according as they are deposited from acid or alkaline urine.

"The clouds which are observed in *acid urine* at the moment of their emission may consist of mucus, pus, seminal fluid, blood, epidermic scales, urates and uric acid held in suspension in the midst of this liquid............ The *sediment* from acid urine may be composed of uric acid, urate of ammonia, phosphate of lime, oxalate of lime, chloride of sodium [?] cystic oxide and mucus, mingled, combined with a certain quantity of the colouring matter of the urine." (p. 510.)

Into their chemical and microscopic characters we need not enter, as they are already well known to the profession through the medium of Dr. Prout's invaluable treatise.

"*Alkaline urines* are generally turbid at the moment of their emission. This appearance is due to the insoluble salts they hold in suspension.......... The sediments of alkaline urines are usually composed of mucus, of phosphate of lime, alone or mingled with ammoniaco-magnesian phosphate; in some rare cases urates and other earthy salts are found also." (p. 513.)

For the methods of distinguishing the various sediments, the reader is referred to the work itself. (pp. 513 bis, et seq)

It is not surprising that diseases of the kidneys should materially alter the composition of the urine; the characters it assumes vary greatly with the stage of the malady. In *nephritis* it generally takes the febrile type with great diminution of the quantity of water; occasionally blood makes its appearance. Chronic nephritis often furnishes an alkaline urine loaded with phosphates. The modifications the urine undergoes in morbus Brightii need not here detain us, as our author adds little new on these cases; urea and the peculiar organic matters are diminished, and albumen and sometimes blood make their appearance. In *cystitis* mucus, in varying quantity, is found, so that the urine quickly putrefies; in chronic cases the secretion is usually alkaline and muco-purulent, frequently containing earthy phosphates. In acute *cerebro-spinal* affections the urine is generally febrile; when they assume a chronic form it not unfrequently becomes alkaline. In *diabetes* the quantity of sugar varies much with the nature of the food taken; a little blood is occasionally present, and frequently an imperfect form of albumen; and urea, though in some cases diminished, may always, when due care is

taken, be detected. According to Bouchardat, quoted by our author, the proportion of sugar and urgency of the thirst varies directly with the quantity of amylaceous matters taken; an assertion which, however, requires some limitation, as Dr. Gregor has shown that the stomach in this disease possesses the power of converting even animal matter into sugar. This disease, therefore, is in great measure one of primary assimilation.

Next follows a chapter on the Cellular and adipose Tissues. M. L'Heritier has analysed the fluid effused in various forms of dropsy; he found it generally alkaline, with a specific gravity, varying between 1010 and 1017, always albuminous, and containing from eight to twelve per cent. of this matter.

Fat. The following remarks on the deposition of fat are worthy of notice, though not true in their fullest extent:

"Without speaking of the relations which regulate the biliary secretion and the development of fat, I ought to recall here the influence which respiration, that contributes so much to the elaboration of the blood, exercises upon the qualities of the material products of the organism. Thus when it becomes less lively, the blood assumes a more venous character, and the production of fat becomes more active. The seals and cetacea, animals whose blood is venous in the highest degree, are also abundantly furnished with fatty matter. In a word, every thing which augments venosity, especially a lengthened stay in a moist atmosphere, seldom renewed, favours the production of fat, and it is for this reason that aquatic animals are in better condition than those that live in the air." (p. 573.)

The effusions into the serous membranes greatly resemble those into the cellular tissue, being for the most part alkaline, and containing variable proportions of albumen; the fluid from the pleura, *pericardium*, and peritoneum is more concentrated than that from the other serous membranes. The synovia, except in consistence, does not differ from serous effusions in general in any important particular.

The *mucous membranes*, though their secretions offer modifications of colour, consistence, and appearance, which are familiar to the practical physician, and form valuable guides in prognosis and treatment, have as yet been but superficially examined in their chemical relations. The expectoration from the lungs is especially worthy of careful examination, as it cannot fail, with due attention, to afford valuable aid in diagnosis. The results of a microscopic examination of different forms of expectoration are detailed by Vogel. (pp. 421-4.) The spurious melanosis, or "black spit," to which miners are subject, it is fully proved, depends upon carbonaceous particles introduced from without during the act of respiration. The microscopic characters of mucus in general vary with the nature of the part from which it is taken. Epithelium scales are generally found in it abundantly, besides numerous spherical transparent granular masses which have received the name of mucus-globules.

Still less satisfactory is the state of our knowledge respecting the variations in composition of the *nervous centres* in health and in disease. Some comparative analyses of the brains of idiots and of persons in health have been made by our author, and although few in number, it is worthy of remark that the quantity of phosphorus which he found in healthy brains to be about 1·8 per cent., he observed in the idiot to be only 0·85. A similar diminution has been observed by Couerbe. It is stated, on the authority of John, that the gray matter of the brain is altogether devoid of phosphorus.

The next chapter is devoted to the organs of the External Senses.

Sweat. The secretion from the skin is for the most part acid, and in its healthy condition contains from 0·5 to 1·4 per cent. of solid matters, composed of free lactic acid and lactate of ammonia, animal extractive matters, chlorides of potassium and sodium, phosphate of lime, besides free carbonic acid and nitrogen gases, which are volatilized along with the water. In disease its qualities vary greatly; thus in lying-in women, in children troubled with worms, and in women before menstruating, the quantity of free acid increases remarkably. In jaundice it is often coloured yellow from the colouring matter of the bile; while in persons suffering from gout, lactic, phosphoric, and uric acids have been found. The secretions from the diseased surface in various cutaneous affections have been superficially examined, but yield no striking results; and the same may be said of the other organs of the external senses.

Next follow the Products of the Organs of Generation.

Semen. It is sometimes necessary in medico-legal investigations to ascertain whether spots on linen be due to the spermatic fluid or not. If due to the seminal liquid the linen is stiff, and when moistened, the peculiar odour of the secretion becomes perceptible; on holding the linen to the fire the stains become distinctly yellow. Macerated in a small quantity of water, and then the fluid examined by the microscope, the spermatozoa may generally be recognized.

Milk. This fluid, the most important aliment in a physiological point of view, inasmuch as it is the only one which contains everything necessary to the support of life, consists of the same substances in all the mammalia, although the proportions in which they occur vary considerably. In the human female the azotised matter, casein, constitutes from 1 to 2 per cent.; butter, from 3 to 8 per cent.; sugar of milk, from 7 to 8 per cent. It is always alkaline, and among the salts, the quantity of which is from 2 to 2·5 per cent., are free soda, chlorides of sodium and potassium, and phosphates of lime, magnesia, and iron, the latter in very minute quantity. Late researches appear to have shown that the solubility of the casein depends on the presence of alkali in combination with it. The composition of milk varies with the period that has elapsed since parturition. That first furnished, known as colostrum, is denser than that which flows subsequently; it becomes gelatinous on the application of heat. According to the researches of Simon on human milk, it contains twice the usual quantity of fat, and half as much again of sugar, besides a larger proportion both of casein and saline matter. Besides the ordinary fat globules, it appears to contain a number of larger, irregular, granular particles, which gradually disappear with the subsidence of the milk fever. Milk long detained in the breast becomes watery and impoverished, so that that which flows last during the operation of suckling is the richest in solid matter. If menstruation occur during lactation the milk becomes more serous, and frequently disagrees with the infant. Violent mental emotions of various descriptions appear to modify the secretion in a manner more irregular and less perfectly understood. From some experiments made by our author, he finds that the milk from brunettes is in general richer than that furnished by women of fair complexion. Various compounds pass from the system into the milk. "Common salt, sulphate of soda, iodide of potassium, oxide of iron,

trisnitrate of bismuth, passed into the milk of asses." (p. 638.) Mercury probably does the same, judging from the effect of the medicine upon syphilitic infants when administered to their nurses.

The tenth chapter is devoted to the Locomotive Apparatus.

Bone. The composition of the bones varies with the different parts of the body from which they are taken. The proportion of animal matters to the earthy may be stated in round numbers as 2 to 3. Their constituents in the human subject are gelatin, (or a tissue which when boiled furnishes this principle,) phosphate and carbonate of lime, phosphates of magnesia, soda, and chloride of sodium. Fluoride of calcium has been mentioned among the constituents of the bones, but Dr. Rees has shown that it admits of considerable doubt whether it really does exist in them. The bones have been subjected to analysis in various diseases. In caries and necrosis no chemical alteration has been detected. In rickets and mollities ossium the proportion of earthy matters has been found so much reduced as to bear to the animal matters the ratio of only 1 to 3, and the proportion of phosphate of lime diminishes in somewhat greater proportion than that of the other saline components. Permanent callus differs little in composition from ordinary bone; when first deposited, the organic compounds predominate, and the phosphate of lime bears a smaller ratio to the other salts than in healthy bone. The *teeth* are more compact than ordinary bone, and contain about 3-10ths of organic matter. They are occasionally encrusted with a calcareous deposit, known as the tartar of the teeth, consisting of about 80 per cent. of phosphates of lime, and the remainder of mucus and the constituents of the saliva.

Little of interest is known respecting the changes which the *muscular system* undergoes. Fibrin forms the essential ingredient in *its* composition, but in certain degenerations of the tissue we find the true muscular fibre replaced by a peculiar saponifiable fat, the nature of which has not been accurately ascertained. In a few instances the texture has been found ossified and composed of the same ingredients as healthy bone. The aponeurotic, tendinous, and ligamentous tissues contain, besides albumen, a considerable proportion of matter convertible by boiling into gelatin; but this principle does not appear to exist ready formed in them.

The concluding chapter of the work is devoted to Morbid Products.

False membrane. The principal ingredients in this are albumen, in its coagulated and uncoagulated form, and fibrin. In one instance, analysed by L'Heritier, cholesterin was found to be present.

Pus. This product, when healthy, has a specific gravity of 1031 to 1033. It is generally neutral to litmus; by exposure to air, it soon undergoes decomposition. It varies greatly in appearance with the nature of the surface from which it is secreted. Nothing definite respecting the chemical differences presented by these varieties is known. Pus has been found by analysis to contain albumen, lactates, chloride of sodium, phosphate of lime, with a small quantity of iron. Respecting its microscopic appearance, we have nothing to add to the quotation already made when speaking of its occurrence in the urine. Treated with ether, pus gives up a certain proportion of fatty matter, by which Rayer proposes to distinguish it from mucus; but this is a vague and uncertain character, as fat may find its way into the different secretions from other sources than the formation of pus, and Dr. Bird found only 0·5 per cent. of fat

in pus which he analysed from a psoas abscess. Our author seems to favour the exploded doctrine of a resolution of certain parts of the solids into pus, and we shall therefore not be surprised to find his ideas on its formation rather hazy and ill developed.

Tubercles. After successfully refuting, both on chemical and physical grounds, the hypothesis of Lallemand and Cruveilhier, that tubercles arise from concrete pus, he furnishes us with the following excellent specimen of the art of wrapping up ignorance in the garb of science, and passing it off upon the unwary under the guise of sterling knowledge:

"It is with tuberculous matter as with pus. It is a heterogeneous product, capable, in my opinion, of developing itself under the influence of a variety of causes whenever the tuberculous diathesis exists. Like pus it may proceed from metamorphosed blood; like it also it may consist in the transformation of a normal or abnormal tissue.

"In all these cases the formation of tuberculous matter depends upon the inability of the tissue to assimilate, that is to say, to convert into its normal substance the materials brought for its nutrition; whether because the materials resist the transformation, or because the assimilating power of the tissue cannot exert itself with sufficient energy to master the material to be assimilated. The principal cause depends either upon the plastic activity in general being altered from its normal conditions, upon the formation of the blood remaining incomplete, or else upon the degeneration of this fluid." (p. 680.)

Vogel gives the following account of the microscopic examination of tubercular matter. After directing a thin slice to be placed under the object glass, he says—

"We see now in the proper substance of the tubercle absolutely no blood-vessels, and convince ourselves by repeated examinations of such fresh sections, that the substance of the tubercle itself not only contains no blood-vessels, but that by its deposition in the pulmonary tissue the original vessels of the lungs have been compressed and obstructed. We discover, on the other hand, the serpentine fibrous bundles of the substance of the lungs forming meshes, and still entirely unaltered between the masses of tubercle. If, concealed by masses of tubercle they do not at once appear evident, they will do so on adding ammonia, which renders the substance of the tubercle transparent. If we examine the substance of the tubercle more accurately, by washing with water, rubbing it down, tearing it with needles, and so forth, and seek to resolve a fine section into its morphological elements, we shall convince ourselves that it consists entirely of an aggregation of the tubercle-cells already mentioned, without any connecting medium." (Vogel, p. 458.)

These cells are thus described:

"In different cases of tubercular disease, and even commonly upon the same spot of the same tubercle, the cells exhibit great differences. Sometimes they are small, only from 1-200 to 1-400 of a line in diameter, for the most part roundish, with pale outlines; their nuclei are proportionately large, from 1-300 to 1-500 of a line in diameter, and are commonly roundish, rather dark, with or without nucleoli; they fill up almost the whole cell, which contains no solid particles beside the nucleus; in other cases the cells are larger, 1-80 to 1-200 of a line in diameter, sometimes roundish, sometimes oval, at others of irregular form, elongated or drawn out into a tail; their nuclei are smaller in proportion to the size of the cell, and occupy only a third or fourth part of its capacity. These cells, besides their nuclei, often contain small globules of fat, in greater or less number..... In other cases the cells contain granules of a black pigment.

"We find that the tissue of the lungs infiltrated with tuberculous matter, passes quite gradually into the healthy tissue, and in the former we never find anything resembling a membrane inclosing the tubercle. The surrounding pulmo-

nary tissue appears sometimes normal, sometimes filled with nucleated cells, a consequence of the inflammation excited by the pressure of the tuberculous mass upon the neighbouring parts." (Ib. p. 457-9.)

The principal chemical constituent of tuberculous, like that of all malignant deposits, is albumen; and in addition, gelatin, fibrin, fatty matters, phosphate and carbonate of lime are enumerated. In hardened tubercles, L'Heritier found 5 to 9 per cent. of animal matters, and from 91 to 95 of a mixture of carbonate and phosphate of lime.

In *colloid* matter gelatin is said to preponderate.

The *encephaloid*, or medullary tumour, appears to contain, besides albumen and fibrin, gelatin, phosphorized fat, and occasionally cholesterin, besides saline matters. The deposit in *melanosis* consists principally of albuminous and fibrous matter, with a variable proportion of fat, coloured with an organic substance, soluble in dilute sulphuric acid, and resembling in everything but its colour the hematosin of the blood. Phosphate of lime and iron are found among the saline ingredients. Except in the absence of the colouring matter, and in the variation of the proportions of its constituents, which here, as well as in melanosis, vary greatly, the matter of *scirrhus* differs little in composition from that of the last-named disease.

Calculous concretions. These occur in various parts of the body, and as they are derived from the deposition of sparingly soluble compounds contained in the different fluids, they naturally vary with the situation in which they occur, and the composition of the secretions from which they are separated. Under the prepuce, concretions have been found, consisting of phosphate of lime, mucus, and fatty matter. From the tonsils, larynx, nose, salivary, lacrymal, and pancreatic ducts, and bronchi, calculi have been taken, consisting of carbonates and phosphates of lime and magnesia, mucus, and fatty matter. The proportions of these vary greatly, and the magnesia is always small in quantity. Arthritic calculi, besides phosphate of lime, generally furnish a considerable proportion of the urates of soda and lime.

Intestinal calculi our author divides into three classes, according to their origin:

"1st. Those which originate in nuclei formed either in the alimentary canal or biliary apparatus, but which are covered with saline particles or animal matters during their passage through the intestines: 2dly, those which originate in nuclei composed by foreign bodies, such as seeds, stones of fruit, the husks of fruits, fragments of bones, &c., covered with crystalline particles which would not have become aggregated but for the presence of these foreign bodies; and 3dly, those which are entirely formed in the digestive tube which are homogenous, and present no distinct nuclei. It is not very rare to find in the alimentary canal, and more particularly in the large intestine, concretions entirely different from those of which I have just spoken. Some are concreted masses ordinarily derived from three sources: 1st, A morbid state of the secretions poured into the digestive tube or secreted upon its surface; 2dly, an alteration of the fecal matters which occasionally become charged with earthy particles during their retention in the cæcum and in the large intestine; and 3dly, the introduction into the stomach of substances not susceptible of digestion. Others are of a fatty or adipocirous nature." (p. 695-7.)

Biliary calculi. These also consist of three principal varieties:—the *lamellated*, which are hard and but slightly inflammable; the *radiated*, or striated, which bear a crystalline semi-transparent appearance, and

often a granular surface,—they consist of cholesterin nearly pure; and the *corticated*, consisting of a lamellated nucleus of cholesterin, enveloped by an intermediate layer, over which is a crust or bark of infusible matter. Besides cholesterin, which is the principal ingredient of most biliary calculi, the following substances have been met with: The yellow and green colouring matter of bile, picromel (or bilin), mucus, albumen (?), carbonaceous matter, carbonates of lime and soda, phosphates of lime and magnesia, and oxide of iron.

Our author concludes his treatise with a brief summary of the most important facts relative to *urinary calculi*. A neat sketch of the methods of detecting the presence of the different ingredients is given; and a few pages are devoted to the chemical treatment of calculous disorders, in which considerable stress is laid upon the method of treatment by alkalies. The expectations of success held out are considerably more sanguine than we are warranted in forming from experience.

In conclusion, we may safely recommend the treatise of M. L'Heritier, as a valuable aid in the study of chemical pathology. Although he is apt to be prolix in unimportant matters, and to subdivide his subjects to excess, his work will be found a judicious compilation of most that has been done upon the subject, and we have pleasure in adding that the writer appears to have studied with care the researches of foreigners as well as those of his own countrymen, though he has not always been sufficiently careful in stating the source whence his information is derived: he has at the same time added many valuable analyses and observations of his own. The work is, however, deficient in the terseness, close reasoning, and laborious accumulation of facts which distinguish that of Lehmann; and in the novelty and originality of investigation which mark the treatise of Vogel.

From the review we have just taken of one of the most recent treatises on pathological chemistry, we see how vague and incomplete our knowledge is upon almost every part of this important branch of science. We are as yet but just entering upon its study. Great difficulties in its prosecution have still to be overcome. These arise in part from our ignorance, in part from the very nature of the subject itself. In no department of inquiry is a more scrupulous attention to literal accuracy necessary, inasmuch as the observations and analyses being made upon peculiar and individual cases are not susceptible of the severe verification and close scrutiny by other observers, which researches in many other departments of science admit, and from which we derive such a feeling of exactness and certainty in the deductions obtained. Speculations of high interest have been thrown out; the field of investigation is new; many ardent inquirers have entered upon it, eager to obtain a reputation where labour and accuracy are alone needed to ensure a creditable station. The labour is willingly given, but the accuracy which alone can render that labour valuable, has too often been forgotten or neglected, either from the inadequacy of those who have undertaken the task to execute it satisfactorily or, what is still less excusable,—from indolence or over-hastiness, and consequent omission of the needful precautions. Great, however—even in this early stage, and notwithstanding our comparative ignorance—are the benefits that have accrued to the science of medicine from the

prosecution of Pathological Chemistry; and proportionately great, therefore, is the encouragement we may derive for its further cultivation; as it is impossible to doubt that increased knowledge will add to the precision and fitness of our remedial measures, as well as to the accuracy of that upon which all treatment must be based, our diagnosis of disease.

The researches of the present day seem all converging towards one point, viz. the mutual convertibility of the various species of force; rendering it probable that the amount of force existing on our planet is as definite as that of matter itself. The leading idea in Liebig's treatise is the dependence of all manifestations of vitality upon a definite and corresponding amount of chemical force; an idea at present wrought out, it is true, but imperfectly, and often supported by this ingenious philosopher rather by sweeping analogies and bold speculation than by sober experiment and careful observation: but the general correspondence of facts with the theory recommends it strongly to our notice, and the simplicity and beauty of the hypothesis almost irresistibly leads the judgment captive. The close mutual dependence of the forces of electricity and magnetism is now established beyond the shadow of a doubt; a connexion so intimate that a correct estimate of the amount of the one forms the most accurate measure of the quantity of the other,—a connexion so intimate that from the same source we may at pleasure obtain either, and when obtained, we may, by a slight modification of our arrangements, convert the one into the other, as is strikingly exemplified in that invaluable instrument the galvanometer.

Not less closely related to electricity and magnetism is the equally subtle and important agency of heat. The researches of Melloni, who, in the beautiful thermomultiplier devised by Nobili and himself, applied Seebeck's discovery of thermo-electricity to the investigation of the laws of radiant heat, have shown that the deviation of the magnetic needle, produced by an electric current excited by the rays of heat falling upon the exposed surface of the multiplier, may be employed as an accurate measure of the quantity of heat which falls upon the instrument at any given moment; and we are all familiar with the converse of the fact in the intense evolution of heat produced during the passage of electricity through imperfect conductors, a property of which the chemist avails himself to fuse the most refractory substances in nature, and which may, under due regulation, as in Snow Harris's experiments, be employed as an exact measure of the force in circulation. Faraday has taught us that we may convert a given amount of electric action into a chemical action equally definite in quantity, and, *vice versâ*, that chemical action may be made to produce a corresponding and equivalent development of electricity, and if of electricity, an equivalent amount also of magnetism and of heat. Indeed, the definite quantity of heat, disengaged by chemical action, has been ascertained by direct experiment, independent of the electricity set free, and to chemical action we ordinarily have recourse for the production of artificial heat.

Here are four of the subtlest agents of the material universe related by the closest ties. The measure of the one becomes a measure of each of the others, and doubtless, could we make the suitable arrangements, we should always find one force associated with a corresponding amount of each of the others. They appear not to be independent forces, each

having a separate existence, but merely different manifestations of one and the same invisible and imponderable agent.

Further, mechanical force may be converted into magnetic, and magnetic again into chemical. *E. g.* In a patent recently taken out, gravitation, by the falling of a weight, or elasticity, by the uncoiling of a spring, causes a piece of soft iron, properly surrounded by wire, to revolve rapidly in front of the poles of a horse-shoe magnet; an electric current is induced in the wire, and this current is employed for precipitating metallic copper from its solutions, and a voltatype impression is thus obtained by the conversion of mechanical into chemical force. Chemical force is again converted into mechanical in every steam-engine at work in our land; for every cwt. of oxygen that combines with the coal or coke of its furnace, an equivalent amount of water is, or may be, converted into steam, and the elasticity of this steam is then made to perform, at the will of him that raised it, any species of mechanical work to which it shall please him to apply it. Transformations of force analogous to these seem to keep the universe in motion; its varied phenomena resolve themselves into the transfer and transformation of forces. In all human inventions, however, for the transformation of force, power is lost; we cannot employ the whole of that which is set free; our contrivances are imperfect, and our methods of economising and measuring the forces with which we deal are incomplete and inaccurate. Not so with the contrivances of the Divine artificer: He knows exactly what arrangements are required to employ the whole power He sets in motion: and may we not, without extravagance, suppose that the varied phenomena which constitute the sum total of vitality may result from the simultaneous employment, by appropriate channels, of *all* the forces developed at the instant that any *one* of those forces (as we are in the habit of considering them) is developed? Is it impossible that by the inscrutably delicate arrangements of organization scope may be given to the manifestation of another modification of force which we term vitality? Or is it too much to imagine that life is maintained not by chemical agency alone, but by the union of all the forces set in motion whenever chemical action, as being the most convenient in its adaptation to our frame, is excited?

Leaving speculation, however, let us descend to the realities of fact, enjoining upon ourselves a double caution lest, warped by preconceived theories, our judgment should err, and we should, as the most ingenuous minds often unwittingly feel tempted to do, bend or gloss over our facts till they accommodate themselves to our own crude hypotheses as to what *must* be, instead of contenting ourselves with the discovery of things as they actually exist.

ART. XI.

1. *Œuvres Complètes d'Hippocrate, Traduction Nouvelle, avec le Texte Grec en regard, collationné sur les Manuscrits et toutes les Editions; accompagnée d'une Introduction, de Commentaires Médicaux, de Variantes, et de Notes Philologiques; suivie d'une Table générale des Matières.* Par E. LITTRÉ, Membre de l'Institut et de la Société d'Histoire Naturelle de Halle.—*Paris,* 8vo, vol. I, 1839, pp. xvi, 637; vol. II, 1840, pp. lv, 717; vol. III, 1841, pp. xlvi, 563.

The Complete Works of Hippocrates, a new Translation, with the Greek Text on the opposite Pages, collated with the Manuscripts and all the Editions; with an Introduction, Medical Commentaries, various Readings, and Philological Notes; followed by a general Index of the matter therein contained. By E. LITTRÉ, &c.

2. *Hippocratis Nomine quæ circumferuntur Scripta ad Temporis Rationes disposuit* CHRISTIANUS PETERSEN, in Gymnasio Hamburgensium Academico Philol. Class. Prof. P.; pars prior. *Præmissum Indici Lectionum in Gymnasio Academico A.* 1839 *habendarum.—Hamburgi,* 1839. 4to, pp. viii, 55.

The Writings which commonly go under the Name of Hippocrates, chronologically disposed by CHRISTIAN PETERSEN, &c.

"WHAT from its antiquity," says James Harris, in the preface to his *Hermes,** "is but little known, has from that very circumstance the recommendation of novelty; so that here, as in other instances, *extremes* may be said to meet:"—and accordingly we think that *there may* perhaps be more of the interest of novelty in occasionally laying before our readers a few sketches of the origin and early history of different branches of medical science, than in giving an account of the latest discovery or the newest theory. We must confess too that our editorial conscience has been somewhat troubled from time to time at the thought of our having so sparingly fulfilled our early promise of now and then making room for retrospective reviews of works, which once enjoyed a just celebrity, and which are still worthy of being remembered; and therefore we were not sorry to have an opportunity offered us on two recent occasions of partially redeeming our credit with our more learned readers both at home and abroad, by saying a few words on the anatomy and physiology of the ancients, and thus proving that even in these branches of science (which are universally agreed to be one of their weakest points), our fathers were not quite so ignorant as some of their undutiful children are apt to think them. And still more gladly have we hailed the appearance of M. Littré's work, both because we think it seems likely to supply in a great measure a desideratum in medical classical literature, which all competent judges have long acknowledged, and which several of the most learned members of our profession have

* [The writer has begged us to say that this sentence was written before the appearance of our last April Number, in which he found that the same quotation (though taken from a different work by the same author), was made use of in a similar manner at the close of the review of Dr. Greenhill's Theophilus.—ED.]

in vain endeavoured to fill up,[b] and also because it forces us in a manner to discharge a duty which might otherwise have been driven off for an indefinite time, and to offer some account of the life and writings of one of the oldest and ablest of the ancient physicians, "the divine old man," "the father of medicine" himself.

It is certainly no affected humility, but the very simple truth, to acknowledge that we enter upon this subject with no ordinary feelings of diffidence and distrust; for we cannot but call to mind the names of some of those great men who during a period of more than two thousand years have commented on the writings of Hippocrates, and have employed their utmost critical acumen in the endeavour to separate the chaff from the wheat, and to determine which among the numerous treatises that bear his name have really a right to claim him as their author. In the present instance, however, the labours and difficulties of our task have been much lightened by the works before us, especially that of M. Littré, which is at once so complete, so learned, and so accurate, that we think we cannot do better than lay before our readers a tolerably full abstract of his Introduction, making such references to the two other works as we may from time to time feel necessary, inasmuch as they do not seem to us to require so careful a perusal nor so complete an analysis. We must also reserve to ourselves the right of occasionally differing from each of the learned writers; and, finally, we trust they will not think us anxious to depreciate the merit of their works if we supply a few omissions, and correct one or two mistakes,

"quas aut incuria fudit,
Aut humana parum cavit natura."[c]

[b] Of these it may be sufficient here to notice particularly two, the latest and the most valued: 1st, Adamantius Coray or *Koray*, (born at Smyrna, 1748, died at Paris, 1833,) who published a learned and excellent edition of Hippocrates 'De Aëre, Aquis et Locis,' in Greek and French, 2 vols. 8vo, Paris, 1800, and whose name was well known in the literary world as the editor of several other classical works; and 2d, F. R. Dietz, who died at Königsberg in 1836, at the early age of thirty-seven, and who had spent several years in travelling almost all over Europe partly at the expense of the Prussian government, for the purpose of collating Greek, Latin, Arabic, and Sanscrit medical manuscripts. The principal fruit of his labours, which he lived to publish, is to be found in his 'Scholia in Hippocratem et Galenum,' 2 vols. 8vo, Regim. Pruss. 1834, which are interesting and valuable, though bearing evident marks of carelessness and haste; but the greater part of the remainder of his manuscripts is being now edited by J. L. Ideler at Berlin, of which two volumes have already appeared under the title 'Physici et Medici Græci Minores.' [Since writing the above sentence we regret to say that we have been informed of M. Ideler's premature death, an event which must be a source of much regret to all who take an interest in ancient Medical Literature. We have not heard who has been appointed by the Prussian government to continue the work.]

[c] In performing this last part of our duty, (which we would always gladly be spared, though some of our ill-natured readers believe that it is precisely that in which we take most pleasure,) we are saved a good deal of trouble by the fact of our not having noticed the works earlier; the consequence of this is, that almost all M. Littré's oversights have been already discovered and pointed out in other journals, and we think it would not be consistent with our duty either to the author, to our readers, or to ourselves, to bring forward a long list of errata, which he has himself freely acknowledged and corrected in the second and third volumes of his work. The critiques that have come to our knowledge are: 1, in Miller's 'Revue de Bibliographie Analytique,' tome i, pp. 219, 506, tome ii, p. 892; 2, by Dr. Ermerins, in the 'Hallische Allgemeine Literatur-Zeitung,' 1839, Oct., pp. 179-80; and 3, by M. Rosenbaum, in the 'Archiv für die gesammte Medicin, herausgegeben von Dr. H. Haeser,' B. i, Heft i.

We could have wished to have given some account of the labours of M. Littré's predecessors, but as this would take up too much space, we must refer our readers to the first volume of his work, where (pp. 540-54,) he will find a full and candid estimation of all the previous editions of the complete works of Hippocrates. Before, however, proceeding to analyse the contents of the work, we cannot refrain from saying a few words on its external appearance and arrangement; and this we shall do with the less scruple, in the hope that the editors employed on the ancient physicians by the Sydenham Society, may be able to extract from our remarks some few hints that may be useful to themselves.

The most prominent external defect is the omitting to mark in the margin of each page the corresponding pagination of the principal former editions, which is of the more consequence, as the treatises are arranged in quite a different order from that which has usually hitherto been followed; and the result of which is, that any attempt to find a passage quoted by the pages of any of the common editions (such as that of Foes, Vander Linden, Kühn, &c.) is almost hopeless. This omission alone is quite sufficient to render the work so incomplete as entirely to prevent its ever superseding the use of Kühn's edition, of which the insertion of the corresponding pagination of Foes, Chartier, and Vander Linden, is almost the only excellence, but which, with all its imperfections,[d] seems still likely to maintain its place as the most popular edition, until we obtain a complete and uniform collection of the works of the principal ancient physicians, equally commodious in size, type, &c., and of greater critical value.[e]

Another defect, in our opinion, is the mixing together at *the bottom* of the page the various readings, the shorter notes on the *text itself*, and the longer annotations referring to the subject-matter; whereas it would have added no less to the beauty of the book than to the convenience of the reader, if these last had been placed together at the end of the volume.

[d] The critical merits of Kühn's collection (except perhaps the Aretæus and Dioscorides) are certainly very small, and yet we must acknowledge that it has done good service to the cause of ancient medical literature, first by furnishing us with an edition of these old writers in a less cumbrous form than the huge folios of the sixteenth and seventeenth centuries; and secondly, by exciting an interest in the subject which thirty or forty years ago was almost extinct, and which has been continually increasing from that time to the present. It ought also to prevent our speaking too harshly of Kühn's editorial labours, if we remember that at the time of the appearance of the first volume of his Collection (1821), he was already in his sixty-seventh year, a time of life when few persons would have the courage to undertake so vast a work.

[e] A work such as that which we have been contemplating is far too great for any single editor to attempt, (as, indeed, the example of Kühn may prove,) nor (now that the days of Aldus, and Stephens, and Elzevir are gone by,) would it be easy to find a publisher who would be willing to bear the risk and expense of such an undertaking in the cause of medical literature—unless, indeed, it should happen to be comprehended in one of the magnificent schemes of M. Didot. However, it is to some medical college or association, like the Sydenham Society, that we have a right to look for the accomplishment of this project in a manner worthy of the country of Linacre, Caius, Freind, and Wigan; nor do we think so meanly of the classical taste and learning of our medical brethren in Great Britain as to doubt that, when once their attention has been called to the subject, some few fit and proper persons may be found able and willing to act as editors.

A short marginal analysis of the contents of each chapter would have been a great assistance to the reader in finding any particular passage. This is found in several of the best modern editions of Greek and Latin historical works; and though the example has not hitherto been frequently followed by the editors of the ancient physicians, we hope that the plan may be more generally adopted for the future, especially as it will give very little additional trouble to the editor.

Before we finish these few introductory observations, we cannot help remarking the very great prolixity of the general Introduction, of several of the Arguments prefixed to each treatise, and of some of the notes, which might very easily have been compressed into little more than half their present length. On this subject we cannot do better than quote a few lines from a critique in the 'Quarterly Review,' (vol. 64, p. 378,) on the Æschylus of Mr. Peile, who had fallen into the same error, which, indeed, few writers of notes in the vernacular tongue have managed to avoid. "This comes of the 'fatal facility' of *French* note-writing! *French* is as unfit for notes, as Latin is for Lexicography. Latin is in itself the language for notes; and there are, besides, extrinsic advantages: Latin notes, for instance, must be terse; here is one check to prolixity; Latin notes cost most men a good deal of trouble; here is another." And though we are not quite sure that we should be inclined to extend this dictum to biographical and historical Introductions in general, yet in the present instance we confess we would rather have had to read about three hundred pages of Latin, than *five hundred and fifty-four* pages of French.

We might mention several little particulars in which we think the beauty of the work might have been increased, but we must not forget that "*beauty*" is a vague and arbitrary term, nor attempt to force a foreigner to adopt our English notions on the subject of taste. We therefore gladly proceed to give some account of the internal and more important merits of the work.[f]

M. Littré tells us in his preface, (p. vii,) that his labours on the works of Hippocrates have had a three-fold object, viz., the revision of the text, the furnishing a correct translation, and a medical commentary. The first part of this task he found much more troublesome and laborious than he had expected, as the text of the writings of Hippocrates, (or, as M. Littré calls them for brevity, "the Hippocratic Collection,") had received very partial correction since the time of Foes, and remained almost in the state in which it had been left by him. In order to remedy this defect, M. Littré has collated, (and apparently with great care,) all

[f] We may, however, notice one very singular peculiarity, which must have been more cumbrous to the editor himself and to the printer than to the reader; we allude to his plan of designating the different manuscripts in his notes, not by certain conventional letters, (A, B, C, D, &c.) as is usually done, but by their actual numbers in the catalogue of the Royal Library at Paris, viz. 2140, 2142, 2253, &c. The consequence is that he has used at least three times as much space as was necessary, and *that*, too, without any conceivable advantage. However, the editor himself seems to have been fully sensible at last of the clumsiness and inconvenience of this method of quoting the manuscripts, (we only wonder how he could ever have thought of it!) and accordingly he has in the latter half of the second volume adopted the shorter and more usual one. (See tome ii, p. 378.)

the MSS. of the Royal Library of Paris, to the number of sixty-two,[g] (tome i, p. 511, &c.,) from which he has derived the most valuable assistance. The various readings that he has collected are placed at the bottom of the page, and the reading that he has adopted in the text is discussed and explained with greater or less detail as may be required. He generally follows the manuscript readings, but in certain cases he has departed from them, (p. viii,) in conformity with the rules respecting the use of the Ionic dialect in the Hippocratic Collection, which he has laid down and fully explained in an appendix. (p. 479, &c.) He tells us that it has been his aim to place these writings completely within the reach of the medical practitioners of the present day, so that they may be read like so many contemporary works. (p. ix.) In prosecuting this design, however, he found two great difficulties present themselves: the first arising from the ancient medical theories, which have long ceased to be familiar to the modern practitioners, and which, nevertheless, must be known and understood by any one who wishes to enter into the full meaning of the ancient medical writers; the other difficulty was occasioned by the fact that these works are written in a dead language, in which the medical terms have sometimes a doubtful signification, and sometimes even a deceptive one, inasmuch as the meaning which they bear in modern phraseology is not unfrequently quite different from that which they bore in the writings of the ancients.[h] In order to obviate the former difficulty, M. Littré has given not only a general Introduction to the whole Hippocratic Collection, but also a preliminary Argument at the head of each separate treatise, containing all the information that seemed to be necessary for the due understanding of the work; and with reference to the latter, he has endeavoured to express the meaning of the ancient technical terms as precisely and definitely as possible, an attempt which (as he says himself,) often forced him to undertake a retrospective diagnosis, attended with no less obscurity than that at the bed-side. (p. x.) He quotes some remarks by Grimm, (p. x,) on the use of vernacular translations, with which we fully agree, as there are probably many members of the profession who would be glad to become acquainted with the works of the ancient physicians, but who are unable to read them with ease in the original language or in a Latin version; we think, however, that vernacular translations are likely to be much more useful in every respect if published in a separate form, than if appended to the original text and the necessary critical notes, &c., which of course more than double the price of the work, and (in the eyes of the English reader,) add little or nothing to its value. M. Littré apologises for the length of his introduction, (pp. xi, xii,) which certainly might have been written in a less diffuse style without any detriment to the work, and greatly to the comfort of the reader; and he then proceeds to mention some of the principal alterations that he intends to make in the arrangement of the works composing the Hippocratic Collection, (pp. xii, xiii,) some of which he is going to omit entirely, as being merely a repetition

[g] Of this large number, only *two* contain the whole of the Hippocratic Collection, most of the others having only one or two of the smaller and less important treatises.

[h] This latter source of obscurity has been noticed and illustrated by a few examples in an article in our Twenty-ninth Number on Prof. Marx's 'Herophilus,' p. 107.

of what is found in another place,[1] and one of which, (viz. the treatise *De Septimanis*,) he will publish for the first time in an old Latin translation that he has discovered in the library at Paris.

In the first volume, which consists of six hundred and thirty-seven pages, only a single work of the Hippocratic Collection is contained, viz. that entitled Περὶ Ἀρχαίης Ἰατρικῆς, *De Veteri Medicina*, which extends from p. 555 to the end; the other five hundred and fifty-four pages being occupied by the Introduction, which treats of various matters connected with Hippocrates, and contains, indeed, almost everything that need be said on the subject. But his object in this Introduction shall be stated in his own words, (pp. i, ii:)

"Do the medical works which have come down to us under the name of Hippocrates, all really belong to this physician? If not, who is the author, or who are the authors, whose works have been preserved under a false name in the Hippocratic Collection? By what mark may we distinguish the writings which really belong to Hippocrates from those which do not? What classification must we introduce into this mass of works, if we succeed in proving that they are derived from different sources? How has it happened that writings have been falsely attributed to Hippocrates, and have been published under his name? To what epoch can we trace back the publication of this celebrated Collection? Was it published during the life-time of Hippocrates himself, or was it not given to the world in its present form till a considerable time after his death? What is the true system of this physician, when we have put aside the books which do not belong to him? In what way was his system attached to the more ancient doctrines, and what immediate fruits did it produce? Lastly, what do we know with certainty about the life of Hippocrates himself, in the midst of all the fables with which it has been embellished? And what certain notions can we form to ourselves of his system, of his way of looking at things, and of his medical character? These are the questions, (each of which contains in itself several others,) that I propose to discuss in the long essay to which I have given the name of *Introduction*, and which I here submit to the judgment of the reader. The further I have advanced in the translation of the Hippocratic Collection, the more clearly I have seen the necessity of carefully discussing all these questions. They are only preliminary, it is true; but they are not on that account the less essential; and amidst the difficulties of the new edition that I have undertaken, I have only felt some degree of certainty from the moment when I solved the problems of literary and medical criticism, which I have just enumerated."

Accordingly, after giving in the first chapter, (pp. 3-26,) a sketch of the medical science before the time of Hippocrates, he proceeds to give an account of the life of Hippocrates himself, (chap. ii, pp. 27-43,) and to describe generally the Hippocratic Collection, or works bearing his name, (chap. iii, pp. 44-65.) In the fourth chapter, (pp. 66-79,) he has collected all the passages relating to Hippocrates and his writings that are to be found in those authors who lived before the establishment of the medical school at Alexandria; in the fifth, (pp. 80-132,) he gives an account of the transmission of the Hippocratic Collection, and of the series of commentators in antiquity; and in the sixth, (pp. 133-53,) of the different lists that have been preserved of the works composing it.

[1] For instance, the eighth section of the 'Aphorisms,' which has always been considered spurious, and of which great part is to be found in the newly-discovered treatise 'De Septimanis;' and also the little works entitled 'De Diebus Criticis' and 'De Ossium Natura,' both of which are mere compilations, consisting of fragments taken from other parts of the Collection.

He then proceeds, (chap. vii, pp. 154-68,) to discuss the data or elements of criticism possessed by the ancients, by which they pronounced judgment on the genuineness of this or that work in the Hippocratic Collection, and to examine their value; and notices in the next chapter, (pp. 169-99,) the modern works which have professedly treated of this subject. This introduces (chap. ix, pp. 200-41,) a discussion on certain points of medical chronology, which tend to determine the genuineness or spuriousness of the different treatises. In the tenth chapter, (pp. 242-61,) he inquires into the relations which some of the works in the Hippocratic Collection bear to each other; and in the eleventh treats of the question of its formation and publication. (pp. 262-91.) After these preliminary matters have been fully discussed, he gives a critical account of each work separately, (chap. xii, pp. 292-439;) and lastly, we have an analysis, (chap. xiii, pp. 440-64,) of the medical doctrines of Hippocrates, and some remarks on his medical character and style. (chap. xiv, pp. 465-78.) In an appendix to the Introduction, he discusses the dialect in which the works forming the Hippocratic Collection are written, (§ i, pp. 479-502,) and gives an account of the text and editions published by the ancients, (§ ii, pp. 502-10,) of the MSS. contained in the Royal Library at Paris, (§ iii, pp. 511-39,) and of the complete editions and translations that have been published in modern times. (§ iv, pp. 540-54.)

Such are the contents of the Introduction, containing much matter for study suited both to the scholar and the physician; those parts, however, which are simply critical, philological, and bibliographical, (as being probably uninteresting to the greater number of our readers,) we shall notice no further than by saying that they seem to have been written with care and accuracy, equal to that which is displayed in the other portions of the work; of the remainder we shall now proceed to give an analysis, noticing chiefly (as far as possible,) those points which best suit the general character of our Journal, and adding occasionally a few observations of our own. To begin with the state of medical science before the time of Hippocrates, which forms the subject of the first chapter:

"When," says M Littré, (p. 3,) "we search into the history of medicine and the commencement of the science, the first body of doctrine that we meet with is the collection of writings known under the name of the works of Hippocrates. The science mounts up directly to that origin, and there stops. Not that it had not been cultivated earlier, and had not given rise to even numerous productions; but all that had been done before the time of the Physician of Cos, has perished, and of these writings we have only remaining a few scattered and unconnected fragments. The works of Hippocrates have alone escaped destruction; and by a singular circumstance, there exists a great gap after them, as well as before them. The medical works from Hippocrates to the establishment of the school of Alexandria, and those of that school itself, are completely lost, with the exception of some quotations and passages preserved in the later writers; so that the writings of Hippocrates remain alone amongst the ruins of ancient medical literature."

In early times there were, according to M. Littré, (p. 5,) three sources from which the medical science of the Greeks was derived: 1, the different colleges of the priest-physicians, who served in the temples of Æsculapius, and took the name of Asclepiadæ,(Ἀσκληπιάδαι,) as being the descendants of the god; 2, the philosophers or physiologists, who employed themselves in the study of natural philosophy, including also

the organization of bodies and the origin of diseases; and 3, the gymnasia, where the persons at the head of these establishments gave great attention to the effects produced on the health of the athletæ by different kinds of food and exercise.

M. Littré considers the worship of Æsculapius to have come to the Greeks from the east, (p. 6,) which is (to say the least) a very doubtful and disputed point;[j] but this mythological question does not concern us at present, nor need we give a list of the principal temples of the god, which soon became very numerous. They seem to have served not only for places of religious worship, but also for a kind of hospital for the sick,[k] and lastly, for a medical school for students. They would also appear to have combined, in some degree, the character of the modern "watering places," as they were built in pleasant and healthy situations, with a sacred grove at hand, (p. 10,) and, if possible, a mineral spring; thus offering to the visitors everything necessary both for health and amusement. The priests of the temple were the physicians; and the patients, when they went away, left behind them in gratitude to the god, a votive tablet, containing a short account of their disease, and of the means used for their recovery: these, in process of time, (as we shall see,) were turned to good account, and probably furnished the materials for at least two works in the Hippocratic Collection.[l]

The most famous of these medical schools before the time of Hippocrates were those of Cyrene, Rhodes, Cnidos, and Cos, (pp. 6, 7;) of these, the two former were soon eclipsed by the two others, which acquired a great reputation, and exercised an important influence on the art and science of medicine. (p. 7.) From the school of Cnidos proceeded the earliest work that can with any certainty be attributed to the Asclepiadæ, entitled *Cnidian Sentences*, (Κνίδιαι Γνῶμαι,) which is now lost, but which was extant at least as late as the time of Galen. (pp. 7, 8.) The Cnidian physicians appear to have divided diseases into a great number of minute species; for instance, they reckoned seven different disorders of

[j] Of the state of the medical art during the Trojan war, (or rather, probably, in Homer's own time,) which is the earliest period when we find a mere mortal exercising the healing art, the following sketch is given by Mitford, ('Hist. of Greece,' chap. ii, § 3, vol. i, p. 158.) "The knowledge of the cure of internal diseases made, it should seem, in Homer's age, no part of the science of physic. It is remarkable that the poet nowhere speaks in plain terms of sickness. Diseases, indeed, and mortal ones, are mentioned, but as the effect always of the immediate stroke of the Deity, and not of anything in the common course of nature. They seem thus to have been esteemed utterly beyond the reach of human skill to relieve. The epidemical sickness of the army before Troy was occasioned by the darts of Apollo, and could be removed only by the prayers of Chryses. That scanty knowledge of nature to which the age had arrived was applied only to relieve the effects of external violence upon the human frame. Skill in surgery was in the highest esteem; though it seems to have gone no further than to the extraction of the instrument of a wound, and the application of a few simples for stopping hæmorrhages, and assuaging inflammations. Charms and incantations therefore were sometimes called to its assistance, or even to supply its place. Ulysses, when very young, being wounded by a wild boar, the hæmorrhage was stopped by incantation."

[k] We believe that no mention of any establishment for the relief of the sick, more nearly answering to the modern hospitals than these temples of Æsculapius, is to be found among the ancients till after the introduction of Christianity. We know that some persons hold a contrary opinion, but we cannot here enter upon the proof of our own.

[l] Some specimens of these votive tablets, which are certainly very curious, may be found in Gruter's collection of Greek Inscriptions, or in the Histories of Medicine by Le Clerc and Sprengel.

the bile, twelve affections of the bladder, four of the kidneys, four species of strangury, three of tetanus, four of jaundice, and three of phthisis. (p. 8.) Those of Cos, on the other hand, paid more attention to the symptoms which announce the curative efforts of Nature, and to the distinguishing the different crises and the critical days. (p. 9.) They did not publish any works till after those of Cnidos, but the little treatise found in the Hippocratic Collection, and bearing the title of *Coan Prognostics,* (Κῳακαὶ Προγνώσεις,) is generally allowed to be anterior to the time of Hippocrates himself, and to be in fact a collection of medical notes selected by the Coan physicians from those deposited by the patients in the temple. (p. 9.) Of the great number of persons claiming to belong to the family of the Asclepiadæ, some few were really descended from Æsculapius, (as, for instance, the ancestors of Hippocrates,) but probably the rest were merely associated with them by initiation, (pp. 11, 12,) and it was perhaps on these occasions that the celebrated *Oath,* (which is placed at the head of the Hippocratic Collection,) was administered.

The results of the labours of the Asclepiadæ, (or priest-physicians,) before the time of Hippocrates, may be shortly summed up: medical attendance on sick persons both in and out of the temples; (or, in modern language, on the "In and Out-Patients of the Hospitals;") an account on votive tablets of the chief peculiarities of each disease, and the mode of treatment; the collection of these notices; the publication of medical works; and the traces of two medical systems, one of which, (the Cnidian,) consisted in noting all the symptoms of a disease, and making of almost every one a distinct malady; the other, (the Coan,) inquired *into what* the symptoms had in common, as indicating the state of the patient's strength and the cause of the disease. (p. 13.)

The second source from which the medicine of the Greeks was derived, is to be found in the schools of the natural philosophers, several of whom composed works on physical science, of which nothing but a few fragments remain. (pp. 13, 14.) The most celebrated of these were Alcmaeon, Anaxagoras, Empedocles, Acron, Diogenes of Apollonia, and Democritus, whose most striking opinions M. Littré quotes, (pp. 14-21,) from which it appears that they dissected animals, inquired into the causes of disease, and endeavoured to introduce into the study of medicine doctrines corresponding to those which they admitted in their philosophical systems.* (p. 21.)

As the third great source of medical science, M. Littré mentions the gymnasia, (p. 22,) where the Greeks learned to reduce fractures and luxations, to examine into the kinds of food that were most conducive to health and strength, to observe what modifications of diet were necessary for different ages and constitutions, and to recognize the changes in outward appearance caused by any departure from the usual regimen. Besides this, they applied gymnastics to the treatment of diseases, and with such success, that many patients left the temples for the gymnasia, and the priest-physicians were induced to study the effects of these exercises, and admit them into their system of therapeutics. (p. 23.)

* There is an interesting little work on this subject, by Kühn, entitled 'De Philosophis ante Hippocratem Medicinæ Cultoribus,' reprinted in his 'Opuscula Academica Medica et Philologica,' Lips., 1827-8. 2 vols. 8vo.

From these three sources had sprung in the fifth century before Christ, a considerable mass of opinions and facts, derived from the study of disease in the Asclepeia, the study of health in the gymnasia, and the spirit of generalization in the works of the philosophers, (pp. 23-4 ;) and it is the union of these that forms the basis of the medical system developed by Hippocrates and his pupils. (p. 24.) For M. Littré is not diminishing the credit of Hippocrates, when he seeks to do away with the illusion entertained by many persons, that from his being called "the Father of Medicine," he was the sole and original inventor of medical science; whereas, it appears, that much had been done before his time, and that his chief merit consisted in developing, adding to, and forming into one complete and harmonious system, the results of the reasoning and experience of his predecessors. (pp. 24-5.)

The personal history of Hippocrates, which occupies the second chapter, need not detain us long, as all that is *known* of his life may be told in a few words, though to mention and refute all the absurd fables that have been invented concerning him would fill volumes. Besides, in a work like ours, which professes to be more medical than antiquarian, we fully agree with M. Littré, (p. 28,) in thinking that his literary history is of more consequence than his biography, properly so called; and that it concerns us more to know what he wrote, than what he did; the books which he composed, than the details of his daily life.

Hippocrates was born, not in Greece proper, but in Cos, a small island off the coast of Caria, probably in the year 460 before Christ. (p. 34.) He accordingly lived in the age of Pericles, and was the contemporary of Herodotus, Thucydides, Socrates, Democritus, Plato, and others of the most celebrated characters of antiquity. He was descended from Æsculapius by his father's side, and from Hercules by his mother's, (p. 35 ;) was instructed in medical science by his father, (p. 38 ;) travelled in different parts of the continent of Greece, (*ibid.;*) and died at Larissa, in Thessaly, (*ibid.*)[a] His two sons, Thessalus and Draco, and his son-in-law, Polybus, were also celebrated physicians, (pp. 36-7,) and are supposed to have been the authors of some of the works in the Hippocratic Collection. Such are the few and scanty facts that are told of the personal history of this celebrated man ; but, though we have not the means of writing a detailed biography, we possess in these few facts, and in the hints and allusions contained in various ancient authors, sufficient data to enable us to appreciate the part he played, and the place he held among his contemporaries. We find that he enjoyed their esteem as a practitioner, writer, and professor; that he conferred on the ancient and illustrious family to which he belonged, more honour than he derived from it; that he rendered the medical school of Cos, to which he was attached, superior to any which had preceded it or immediately followed it; and that soon after their publication, his works were studied and quoted by Plato. (p. 43.)

And now to proceed to the collection of works that go under the name of Hippocrates, of which we possess no fewer than sixty-four, as given in Kühn's edition.

"The first glance at these writings," says M. Littré (p. 44), "shows that they

[a] His age at the time of his death is uncertain, as it is stated by different authors at eighty-five, ninety, one hundred and four, and one hundred and nine years. (p. 38.)

form neither a whole, nor a [connected] body [of medicine], and that we should look in them in vain for the work of a man who had given his attention to all the different parts of medical science. The treatises not only do not refer to each other, but they even present the greatest dissimilarities. Some are complete in themselves; others are only collections of notes which follow one another without connexion, and which are sometimes hardly intelligible. Some are incomplete and mutilated; others form in the whole Collection particular series, which display the same thought and belong to the same author. In a word, however little we reflect on the context of these numerous writings, we are led at once to the conclusion that they are not the work of one and the same person. This remark has in all ages struck those critics who have given their attention to the works of Hippocrates, and even at the time when they commented on them in the Alexandrian school, they disputed about their authenticity. The manifest confusion which exists in the Collection, renders the intervention of criticism absolutely necessary; while, at the same time, the remote date at which these writings were composed, and the absence of direct testimony, render such an undertaking extremely difficult. And if the difficulties of the task were so great, and there was so much room for doubt, even in ancient times, what must be the case in the present day for us, who, since the time of the Alexandrian commentators and Galen, have experienced so many losses in every kind of literature? Many are the works which have had for their object the literary history of the Hippocratic Collection; many the eminent men that have given themselves up to the researches which this history demands; and yet, many are the questions which still remain undetermined, while the different and contradictory opinions held by critics on the authenticity or spuriousness of the same work, show that we have no fixed starting-point, nor any documents that are better than mere conjectures."

But it is not merely from internal evidence, (though this alone would be sufficiently convincing,) that we find that the Hippocratic Collection is not the work of that great man alone whose name it bears; for it so happens, that in two instances we find a passage that has appeared from very early times as forming part of this Collection, quoted as belonging to a different person. (p. 46, &c.)[e] Indeed, if we had nothing but internal evidence to guide us in our task of examining these writings in order to decide which really belong to Hippocrates, we should come to but few positive results, and therefore it is necessary to collect all the ancient testimonies that can still be found, (pp. 64-5;) in doing which, it will appear that the collection, as a whole, can be traced no higher than the period of the Alexandrian school in the third century before Christ, but that particular treatises are referred to by the contemporaries of Hippocrates and his immediate successors. (p. 65.)

We find that Hippocrates is mentioned, or referred to, by no less than ten persons anterior to the foundation of the Alexandrian school; the testimony of each of these individuals is given at length by M. Littré in his fourth chapter, (pp. 66-79,) and among them appear the names of Plato and Aristotle. The formation of the great library at Alexandria, in the third century before Christ, by which, in the reign of Ptolemy Philadelphus, that city succeeded Athens as the principal seat of ancient learning, is a remarkable era in literary history,[f] and especially in that of

[e] Aristotle quotes in his 'Historia Animalium,' (lib. iii, cap. 3,) a passage to be found in the treatise 'De Natura Hominis,' (tom. i, p. 364, ed. Kühn,) and attributes it to Polybus; and Galen quotes a fragment from Euryphon, (Comment. in Hippocr. 'de Morb. Vulgar., VI,' tom. xvii, pt. 1, p. 888, ed. Kühn,) which forms part of the second book of the treatise, 'de Morbis,' (tom. ii, p. 284.)

[f] See Clinton's 'Fasti Hellen.,' vol. ii, pp. i, ii.

the Hippocratic Collection. (p. 80.) At this time the different treatises which bear the name of Hippocrates were diligently sought for and formed into a single collection, and about this time commences the series of commentators which has continued through a period of more than two thousand years to the present day. The first person who is known to have commented on any of the works of the Hippocratic Collection is Herophilus,[q] (p. 83;) the most ancient commentary still in existence is that by Apollonius Citiensis.[r] (p. 93.) Several other names are mentioned by M. Littré, (pp. 86-119,) but none of them deserve any special notice here, till we come to Galen, whose commentaries[s] are at the same time by far the most voluminous and the most valuable that remain, containing matter both historical, grammatical, and medical, and serving as a common storehouse of criticism, from which succeeding commentators, Greek, Latin, and Arabic, have freely borrowed. (pp. 119, &c.) The other ancient commentaries that remain are those of Palladius, Joannes Alexandrinus, Stephanus Atheniensis, Meletius, Theophilus Protospatharius, and Damascius,[t] besides a spurious work attributed to Oribasius,[u] and some Arabic commentaries that have never been published.

These critical works attest the general correctness of the text of certain treatises of the Hippocratic Collection; but it is necessary to discover, if possible, what other works, besides those which we know to have been thus commented on, formed part of this collection in ancient times, and this inquiry is the subject of the sixth chapter. (pp. 133-53.) It appears that tables or lists (*πίνακες*) of the works that bore the name of Hippocrates were made some time before Galen; the oldest of these, however, are now lost, (p. 133,) and the most ancient that still remains is that by Erotianus. (pp. 142-3.) M. Littré compares the different lists with each other, and with the Collection as we now possess it, but we cannot follow him through all the details of his work; it may be sufficient to state, as the result, that our printed editions contain both more and less than was known to the ancients, (p. 148,) and that the treatises are differently arranged and divided from what used to be the case (pp. 149-50), and also bear, in some instances, different titles. (p. 150.) With respect to the data possessed by the ancients for judging of the genuineness of the different treatises, M. Littré considers that in three

[q] Professor Marx in his monograph on Herophilus, (pp. 13, 14,) supposes that he wrote *three* works on Hippocrates, (see Number XXIX of this Journal, p. 110;) this, however, is not quite certain, and M. Littré reckons only *one*. (pp. 83-5.)

[r] It is a short commentary on the treatise 'De Articulis,' and was published for the first time in the first volume of Dietz's 'Schol. in Hippocr. et Gal.' Regim. Pruss. 1834, pp. 1-50.

[s] We possess a Commentary by Galen on the works, 'De Natura Hominis;' 'De Salubri Victus Ratione;' 'De Ratione Victus in Morbis Acutis;' 'Prænotiones;' 'Prædictiones I.;' 'Aphorismi;' 'De Morbis Vulgaribus, I, II, III, VI;' 'De Fracturis;' 'De Articulis;' 'De Officina Medici;' and 'De Humoribus;' with a glossary of difficult and obsolete words, and fragments on the 'De Aëre, Aquis, et Locis;' and 'De Alimento.' We have lost his commentaries on the treatises 'De Ulceribus;' 'De Capitis Vulneribus;' 'De Morbis;' and 'De Affectionibus;' together with a work on the Anatomical knowledge of Hippocrates, on his dialect, on the genuine writings, and on the marks (*χαρακτῆρες*,) that are found in the third book 'De Morbis Vulgaribus.' (p. 119.)

[t] All of these are to be found in Dietz's 'Scholia' noticed above.

[u] This only exists (or, at least, has only been published,) in a Latin translation, of which we believe the last edition was that of Padua, 1658, 12mo.

points chiefly they had the advantage over the moderns. (p. 156.) The autograph MSS. were early lost (p. 155), nor was Galen ever able to discover any even as old as the date of the Alexandrian school, (p. 163;) but, in the first place, there seem to have existed certain traditions relating to the authors of the different works (p. 156, &c.) which were probably *essentially* true, though not correct in all their details, (p. 158;) secondly, the diligent examination of the medical writings belonging to the times immediately before and after Hippocrates, would enable us to fix two limits between which his genuine works must have been composed, (pp. 164-5); and thirdly, a work on the history of medicine, written by a pupil of Aristotle, and which must have been, from its antiquity, of very great value, is quoted by Galen (pp. 166-7), but is no longer extant. In these respects, then, as well as in several others, the modern critic meets with difficulties and checks which did not occur to his predecessors at the beginning of the Christian era; but then, on the other hand, a more searching, and (in some points,) a sounder spirit of criticism has grown up; perhaps, too, the very scantiness of our materials may make us more careful in making use of them; so that altogether, it will not appear presumptuous if we venture to differ in some of our results from what was said by Erotianus and Galen seventeen hundred years ago.

The earliest critic of modern times who undertook to determine which works in the Hippocratic Collection were genuine and which were spurious, was Lemos, who published a little work on this subject towards the end of the sixteenth century, (p. 169:)* as, however, he follows Galen implicitly, this attempt has not much critical value. (p. 170.) *Next followed* Mercuriali,** who divided the collection into four classes; *viz.* 1, works which bear the character of the style and doctrine of Hippocrates; 2, those which seem to be a mere collection of notes, intended for private use, and published after his death by his sons or son-in-law; 3, those which represent his doctrines with tolerable fidelity, but were written, not by himself, but by his pupils; and 4, those which do not belong either to Hippocrates or to his school. (p. 170.) Mercuriali argues chiefly from the style of the works, and attributes to Hippocrates certain characteristic peculiarities, (pp. 170-1,) as for instance, conciseness, obscurity, gravity, &c. &c., all of which is not only sufficiently vague, but also involves (as M. Littré observes,) a complete *petitio principii*, as, before describing the style of his author, he ought to have decided which were his genuine writings. (p. 171.)

It would be interesting and useful to draw up parallel lists of the works acknowledged as genuine by each of the ancient and modern critics, in order that the reader might see at one glance the amount of testimony in favour of each treatise; this, however, we are unable to do here, and must therefore be content with suggesting the plan to any one who takes an interest in the subject.

* It is entitled, 'Judicii Operum Magni Hippocratis Liber Unus,' Salmanticæ, 1584, (Choulant says, 1588,) fol.; Venet. 1592, 8vo; and Misenæ, 1835, 8vo, ed. J. G. Thierfelder. (See Choulant, 'Handbuch der Bücherkunde für die Aeltere Medicin,' Leipzig, 1841, 8vo.)

** Hieron. Mercurialis, 'Censura et Dispositio Operum Hippocratis,' Venet. 1583, (apparently *one* year, if not *five* years, *anterior* to the work by Lemos,) 4to; Basil. 1584, 8vo; Francof. 1585, 8vo; and in his edition of Hippocrates, 1588. (Choulant.)

Gruner has followed the same rules of criticism as Mercuriali (p. 176),[x] stating certain vague and unsatisfactory marks which he believes to be the characteristics of the genuine Hippocratic writings, and adding merely that those treatises in which a greater knowledge of anatomy is displayed, belong to a later period. (p. 177.)

Ackermann[y] (whom M. Littré considers as the surest guide to follow, (p. 196,) and who has fallen into the fewest errors,) accepts the rules laid down by Mercuriali and Gruner, but argues also from tradition and the agreement of the ancient critics. (p. 179.) Grimm[z] considers the testimony of antiquity as the most important guide, and after that, the internal evidence of style, &c., and Gruner's argument from the use of certain anatomical terms. (p. 179-80.)

All these rules (with the exception of that which depends on the testimony of the ancient critics,) were certainly unsatisfactory, as being in some cases vague, in others incorrect; though it must be allowed, that much progress had been made, as the field of criticism had been somewhat extended by each successive investigation since the time of Lemos and Mercuriali. The first person who made a really important addition to these rules was Sprengel,[a] who, by introducing the consideration of the different philosophical docrines that may be distinguished in the Hippocratic Collection, as a means of determining the order of priority of the different treatises, opened a new field of inquiry, which has since been pursued with distinguished success. (p. 181.)

M. Link[b] took for the basis of his criticism the medical and philosophical theories (p. 184,) of which he distinguishes six, and he accordingly divides the Collection into six classes, which he believes to be the work of at least six different authors. (p. 185.) The first class comprehends those treatises in which the theory of bile and phlegm appears (p. 185); in the second, may be distiuguished that of the four humours (blood, black bile, yellow bile, and phlegm,) and that of the four elementary qualities, (hot, cold, dry, and moist,) (p. 188); in the third class he places only one treatise (*De Prisca Medicina*), in which the author argues against those who derived all diseases exclusively from the four elementary qualities, (pp. 189, 557;) the fourth theory considers fire to be the universal agent, (p. 193;) the fifth, air, (*ibid.*;) and the sixth makes mention of a morbific matter flowing down from the head, and extending over the whole body. (pp. 193-4.)

M. Littré considers Link's system of classification to be original and valuable (p. 194), but to be inadmissible in all its details, on account of three positive anachronisms with respect to medical doctrines. (p. 195.)

[x] C. G. Gruner, 'Censura Librorum Hippocrateorum, qua Veri a Falsis, Integri a Suppositis segregantur,' Vratislav., 1772, 8vo.

[y] He is the author of the article on Hippocrates in Harles's edition of Fabricii 'Biblioth. Græca,' (vol. ii, p. 535,) which has been reprinted with some additions by Kühn in his edition of Hippocrates.

[z] In his German translation of Hippocrates, Altenburg, 1781-92, 8vo; Glogau, 1837, 8vo.

[a] Kurt Sprengel, 'Apologie des Hippocrates und seiner Grundsätze, Leipzig, 1789, 1792. 8vo.

[b] H. F. Link, 'Ueber die Theorien in den Hippocratischen Schriften, nebst Bemerkungen über die Echtheit dieser Schriften,' in the 'Abhandlungen der K. Akademie der Wissenschaften in Berlin,' 1814-15.

This leads him to examine the light that may be thrown upon the authorship of the various works of the Hippocratic Collection, by the determination of the date of certain medical terms; and this question forms the subject of the ninth chapter. (pp. 200-41.)

Before, however, proceeding to this part of his introduction, it will be more proper to give some account of M. Petersen's little work, the title of which we have placed at the head of this article, and which, as it did not appear till after the publication of M. Littré's first volume, is carefully analysed and examined by him in the "Advertisement" to the second. M. Petersen is not a physician, but Professor of Classical Philology in the Gymnasium at Hamburg; and consequently he enters upon his subject with a greater store of classical learning than is commonly met with in the physicians of the present day, but at the same time labours under the disadvantage (which every non-professional person must necessarily feel,) of not being perfectly familiar with the subject-matter of the treatises before him. We hope, therefore, that he will not think us ungrateful or disrespectful if we venture to express our opinion that he would have done more service to the cause of ancient medical literature, if he had confined himself to questions of philology, and had endeavoured to determine the chronology of the different parts of the Hippocratic Collection, principally from a consideration of the varieties in style that may be traced in the several treatises composing it. This has never been attempted critically and systematically, (for the vague and indefinite remarks on the supposed style of the genuine works of Hippocrates, by Mercuriali and Gruner, do not by any means supply what is wanted;) and, as this seems to be almost the only *question* connected with the Hippocratic writings that has not by *this time been* thoroughly examined, we hope it will before long be taken up by some philologist, who will thus enable us to compare his conclusions with the results at which others have already arrived by a consideration of the various medical and philosophical theories contained in them.

M. Petersen takes as his basis the classification of M. Link, which, however, is modified in many of its details. He divides the works into nine classes, which he places in the following chronological order (pp. 13, 14): the first contains those treatises in which the flow of bile and phlegm is considered as the cause of disease; the second and third recognize respectively fire and air as the first principle of all things; in the fourth, bile and phlegm are spoken of as the primary humours of the human body; in the fifth, spirit (or pneuma, πνεῦμα,) and moisture are acknowledged as the first principles of generation; in the sixth, the elements of the body appear in opposition to each other; in the seventh, black bile, yellow bile, blood, and phlegm, appear as the primary humours of the human body; in the eighth, bile, water, phlegm, and blood, occupy the same place; and in the ninth, fire and water are supposed to be the first principles of all things.[*] To these he adds two other classes,

[*] We are almost afraid that our readers may think we owe them some apology and explanation for writing in such a strange and unintelligible language. We would, however, remind them that the purely theoretical parts of the ancient medical writers have never been considered the most valuable and interesting portions of their works; and we would gently hint that it is perfectly conceivable that a time may come when some of our modern theories and phraseology may be as much out of date, and as unintelligible to the ordinary medical practitioner, as those in the text now appear to us.

which could not enter into his chronological arrangement; one containing the works on surgery, the other those which consist of moral precepts, &c., and in which no medical doctrines can be traced.

M. Petersen promises to give to the world a second part of his work, in which he will examine each treatise of the Collection separately and more in detail, (pp. 6, 7;) perhaps, therefore, we may be thought premature in noticing his conclusions before we have seen the whole of the evidence in support of them. We shall, indeed, be anxious to see the second part of his work; but in the mean time, we confess that we think it will be difficult to convince us that M. Petersen has not committed in the classification of the different writings of the Hippocratic Collection, some few oversights, of which two striking instances are noticed by M. Littré. (tome ii, pp. 32-3.) We think, also, that he is wrong in some parts of the personal history of Hippocrates, but these we have not room here to specify.

We must now return to our analysis of M. Littré's introduction to his first volume, in which, after having finished his account of the modern classifications of the Hippocratic writings, he proceeds (chap. ix, p. 200, &c.,) to discuss several points of medical chronology, preparatory to laying before the reader his own opinion on the authorship of each treatise. This is to ourselves a very interesting chapter, but, as an analysis of it might not prove equally so to the greater part of our readers, we must content ourselves with stating merely the results at which M. Littré arrives. It appears, therefore, (p. 241,) that in the Hippocratic writings the science of anatomy is very imperfect, except on certain points connected with surgery; the arteries are supposed to be full of air, or are called, together with another set of canals, by the common name of *veins*, (p. 214;) the relation of the blood-vessels with the heart is considered as of little importance, (p. 241;) mention is made of the pulse, but its application and use in medicine are quite unknown, (p. 230;) the word *μῦς*, *muscle*, is *not* used first by the anatomists of Alexandria, and therefore no argument can be founded on the fact of its being found in this or that treatise, (pp. 230-1;) the nerves are mentioned in a vague and obscure manner under the name of *τόνοι*, but their functions and different relations are evidently not known, (p. 234;) and lastly, M. Littré is inclined to think that the human body had been examined by actual dissection with more or less exactness before the time of the Alexandrian physicians. (p. 238.)

In the next chapter (p. 242, &c.) M. Littré proceeds to examine with a considerable degree of minuteness, the connexion between certain works in the Hippocratic Collection, showing that, in many instances, not only the same sentiments, but even the same words, are to be found in two or more of them, and that some treatises are entirely made up of fragments taken from other parts of the Collection, and put together without connexion or order.

With respect to the manner in which the Hippocratic Collection was formed and given to the world, (which forms the subject of the next chapter, p. 262, &c.,) M. Littré first points out eight principal and characteristic circumstances which an attentive examination may discover, (p. 263:) 1st, this Collection does not exist in an authentic form earlier than the date of Herophilus and his pupils in the third century before

Christ; 2d, it contains passages which certainly do not belong to Hippocrates himself, 3d, collections of notes, &c., which would never have been published by their author in their present form, 4th, and also compilations which are either abridged, or copied word for word, from other works which still form part of the Collection; 5th, as the different treatises do not all belong to the same author, so neither were they all composed at the same time, some being much more modern than others; 6th, we find in different parts of the Collection itself, mention made of numerous treatises written by the followers of Hippocrates, which are now lost, and which were no longer in existence when the Collection was first published; 7th, the most ancient critics did not know for certain to whom the several works forming the Collection belonged; 8th, with the exception of a small number, which all of them, for one reason or another, agreed in attributing to Hippocrates himself. Upon these eight propositions (which he expands and illustrates,) M. Littré founds his hypothesis respecting the occasion and manner in which the Hippocratic Collection was first published. He imagines that the genuine works of Hippocrates, together with the rest of his library, continued in the possession of his descendants, the Asclepiadæ; that this family became extinct about the beginning of the third century before Christ, (pp. 285-6,) upon which these works, as well as those which had been composed and added to the library after his death, fell into the hands of persons who knew neither their value nor their origin, except that they came from the followers of Hippocrates, (p. 282;) and that in this state they were placed shortly afterwards in the newly formed library at Alexandria. Their collection into their present form, and the confusion that exists among them, he illustrates by the somewhat similar history of the works of Aristotle, (p. 282, &c.,) which indeed may perhaps have suggested to him the details of his hypothesis. But, however this may be, his account is (like most hypotheses) sufficiently ingenious, and upon the whole, though not in all its details, sufficiently probable to satisfy us in a matter where no certainty is to be obtained.

The twelfth chapter contains an examination of each treatise in the Hippocratic Collection separately, with a view to determine its date and author. (pp. 292-439.) Of this chapter we cannot pretend to give anything like an analysis, as great part of it would hardly admit of abridgment, and it is besides calculated rather for being consulted respecting any particular work, than for being read through. We have ourselves, however, read every page, and may therefore venture to say that, though we do not agree with the writer in all his conclusions, yet upon the whole, we consider it by far the best classification of the Hippocratic writings that has yet been given to the world. We must content ourselves with giving M. Littré's results, without touching upon his arguments in support of them; but before doing this, we may mention the four rules which he has followed in his classification. (p. 292.) The first and most important argument in favour of the genuineness of any of the Hippocratic writings, is derived from the direct testimony of authors who lived before the formation of the library at Alexandria; the second depends on the consent of the ancient critics, who, in many cases (as we have seen in the seventh chapter,) possessed documents to guide their opinion, which no longer exist; the third rule consists in the application

of certain points of medical history, by which the date of a treatise is determined; and the fourth results from the consideration of doctrines, the difference of style, &c.

The Hippocratic Collection consists of more than sixty works,[d] and these are classed in eleven divisions by M. Littré, according to the following system, (p. 436:) he first endeavoured to find a fixed point from which to start in his inquiries, and accordingly began by determining which are the genuine works of Hippocrates;[e] when this was done, it appeared, from comparing his genuine works with the rest of the Collection, that some of the treatises were earlier than his time,[f] (inasmuch as he had made use of them in some of his writings,) and others later. Hence arise three simple and distinct classes, of which the last is subdivided into several others. Of the writings later than the time of Hippocrates, M. Littré attributes two to Polybus,[g] and one, (though doubtfully, and as it seems to us, without much reason,) to Leophanes.[h] Several seem to form a series, and to have been written by the same individual, who is, however, entirely unknown.[i] There still remain a great number of works to be disposed of, several of which bear evident traces of belonging to the school of Cos, and of being pretty nearly contemporary with Hippocrates;[k] while others appear, either from internal or external evidence, to have been written about the time of Aristotle and Praxagoras;[l] and others again consist merely of notes, extracts, &c., which have evidently not been prepared for publication, but which have formed part of the Hippocratic Collection from the earliest times.[m] There remains nothing more except a certain number of smaller works, which are classed together: 1st, as having this at least in common, viz., that they are not mentioned even by name by any of the ancient writers whose works are still extant;[n]

[d] Like the question as to the number of the bones in the human body, it is not possible to say exactly *how many* treatises the Collection contains, or at least not without carefully specifying, not only which works are meant to be included, but also whether some of these are reckoned as one single treatise, or as several.

[e] This forms his first class, in which he comprehends the works, 'De Veteri Medicina;' 'Prænotiones,' (or 'Prognosticon;)' 'Aphorismi;' 'De Morbis Popularibus,' (or 'Epidemiorum,') lib. I and III; 'De Ratione Victus in Morbis Acutis,' (or 'De Diaeta Acutorum;')' De Aëre, Aquis, et Locis;' 'De Articulis;' 'De Fracturis;' 'Vectiarius,' (or 'Mochlicus;') 'De Capitis Vulneribus;' 'Jusjurandum;' and 'Lex.'

[f] Class III, containing the 'Prænotiones Coacæ,' and the first book of 'Prædictiones,' (or 'Prorrhetica.')

[g] Class II, containing 'De Natura Hominis,' and 'De Salubri Victus Ratione.'

[h] Class VII, containing 'De Superfœtatione.'

[i] Class VI, containing 'De Genitura;' 'De Natura Pueri;' 'De Morbis,' lib. IV; 'De Mulierum Morbis;' 'De Virginum Morbis;' and 'De Sterilibus.'

[k] Class IV, containing 'De Ulceribus;' 'De Fistulis;' 'De Hæmorrhoidibus;' 'De Morbo Sacro;' 'De Flatibus;' 'De Locis in Homine;' 'De Arte;' 'De Victus Ratione,' (or 'De Diæta;') 'De Insomniis;' 'De Affectionibus;' 'De Internis Affectionibus;' 'De Morbis,' lib. I, II, and III; 'De Septimestri Partu;' and 'De Octimestri Partu.'

[l] Class VIII, containing 'De Corde;' 'De Alimento;' 'De Carnibus;' 'De Septimanis;' 'Prædictiones,' (or 'Prorrhetica,') lib. II; 'De Glandulis;' and a fragment of 'De Natura Ossium,' called 'De Venis.'

[m] Class V, containing 'De Morbis Popularibus,' (or 'Epidemiorum,') lib. II, IV, V, VI, and VII; 'De Officina Medici;' 'De Humoribus;' and 'De Usu Liquidorum.'

[n] Class IX, containing 'De Medico;' 'De Decenti Habitu;' 'Præceptiones;' 'De Resectione Corporum,' (or 'De Anatomia;') 'De Dentitione;' 'De Visu;' 'De Natura Muliebri;' 'De Resectione Fœtus;' the eighth section of the 'Aphorisms;' 'De Natura Ossium;' 'De Judicationibus,' (or 'De Crisibus;') 'De Diebus Judicatoriis,' (or 'De Diebus Criticis;') and 'De Remediis Purgantibus.'

2d, some others which are manifestly apocryphal;[o] and 3d, the names of three which no longer exist.[p]

Such is M. Littré's classification of the Hippocratic writings, which we think certainly superior to any that has preceded it, though we do not so entirely agree with all its details as to believe it impossible to be improved. The author next proceeds (in the thirteenth chapter, p. 440, &c.,) to give a summary of the medical doctrines of Hippocrates; from which, however, he excludes anatomy and physiology, as being too little understood at that time for him to have had any but vague and imperfect ideas on the subject. (p. 441.) It will at once be seen that, before analysing a man's opinions as they appear in his writings, it is a most indispensable preliminary step to determine which are his genuine works, and which are spurious. This plain rule, however, has not always been very strictly attended to in the case of Hippocrates, either by ancient or modern critics, and the consequence is, that, not only in his intellectual, but also in his moral character, he has received both praise and blame, to which he is not justly entitled.[q] From observing this distinction, M. Littré's analysis of the medical opinions of Hippocrates, though short, is more satisfactory than any with which we are acquainted. Hippocrates divides the causes of disease into two principal classes; the one comprehending the influence of seasons, climates, water, situation, &c., as developed in the treatise *De Aëre, Aquis, et Locis;* and the other consisting of more personal and private causes, such as result from the particular kind and amount of food and exercise in which each separate individual indulges himself, (p. 442,) and which are particularly dwelt upon in his little work *De Prisca Medicina.* The modifications of the atmosphere dependent on different seasons and climates is a subject which was successfully treated by Hippocrates, and which is still far from exhausted by all the researches of modern science. He considered that while heat and cold, moisture and dryness, succeeded one another throughout the year, the human body underwent certain analogous changes, which influenced the diseases of the period, (*ibid.*;) and on this basis was founded the doctrine of pathological constitutions, corresponding to particular conditions of the atmosphere, so that whenever the year or the season exhibited a special character in which such or such a temperature prevailed, those persons who were exposed to its influence were affected by a series of disorders, all bearing the same stamp. (*ibid.*) How plainly the same idea runs through the great work of our English

[o] Class XI, containing the 'Epistolæ;' 'De Insania;' 'De Veratri Usu;' 'Salubre Consilium ad Regem Demetrium;' 'Atheniensium Senatus-consultum;' 'Oratio ad Aram;' and 'Thessali Legati Oratio.'

[p] Class X, containing 'De Mortiferis Vulneribus;' 'De Telis et Vulneribus;' the first book 'De Morbis,' called 'the Less,' (ὁ σμικρότερος).

[q] We may mention two instances of this, both taken from ancient authors. Celsus in a well-known passage, (lib. viii, cap. 4,) extols his magnanimity in confessing that he had been once deceived by the sutures of the cranium, and had overlooked a fracture in consequence; the passage referred to, however, is to be found in the fifth book, 'De Morbis Popularibus,' (tom. iii, p. 561,) which is universally considered to be spurious. On the other hand he is commonly accused of having produced abortion, on account of a passage in a treatise which he probably never wrote, ('De Natura Pueri,' tom. i, p. 385,) and which one of his ancient commentators, (Joannes Alexandrinus in Dietz's 'Scholia in Hippocr. et Gal.' tom. ii, p. 216,) tries in vain to defend and to reconcile with the Hippocratic 'Oath.'

Hippocrates, need hardly be pointed out. The belief in the influence which different climates exercise on the human frame follows naturally from the theory just mentioned; for in fact, a *climate* may be considered as nothing more than a *permanent season*, whose effects may be expected to be more powerful inasmuch as the cause is ever at work upon mankind. (*ibid.*) Accordingly, Hippocrates attributes to climate both the conformation of the body, and the disposition of the mind—indeed, almost everything; and if the Greeks are found to be hardy freemen, and the Asiatics effeminate slaves, he accounts for the difference of their character by that of the climates in which they live. (p. 443.) The analogy between the seasons of the natural year, and the different periods of the human life, is in some respects no less medically, than poetically, correct; and it was more easy for Hippocrates to dwell on this parallel, as it would agree with his theory respecting innate heat, which he supposed to be at its maximum in the human body during infancy, and, while gradually diminishing during life, to undergo certain changes corresponding in a manner to those of the earth during its annual revolution round the sun. (p. 443.)

With respect to the second class of causes producing disease, he attributed all sorts of disorders to a vicious system of diet, which, whether excessive or defective, he considered to be equally injurious; and in the same way he supposed that, when bodily exercise was either too much indulged in, or entirely neglected, the health was equally likely to suffer, though by a different form of disease. (*ibid.*) Into all the minutiæ of the humoral pathology, which kept its ground in Europe as the prevailing doctrine of all sects for more than twenty centuries, we need not now enter. It will be sufficient to remind our readers that the four fluids or humours of the body (blood, phlegm, yellow bile, and black bile,) were supposed to be the primary seat of disease; that health was the result of the due combination (or *crasis*) of these, and that, when this crasis was disturbed, disease was the consequence, (p. 446;) that, in the course of a disorder that was proceeding favorably, these humours underwent a certain change in quality (or *coction*), which was the sign of returning health, (p. 447, &c.,) as preparing the way for the expulsion of the morbid matter, or *crisis*, (p. 450;) and that these crises had a tendency to occur at certain stated periods, which were hence called *critical days*. (p. 451.) From the general consideration of the causes of disease, and from the several parts of the humoral theory, resulted (what was called in the time of Hippocrates,) *prognosis*, (*ibid.*;) a word which related not only (as it is now used by us,) to the future, but also to the past and present condition of the patient, (p. 452,) and which, in fact, comprehended no less than the whole of the *science* of medicine, (properly so called,) without which there remained nothing but a blind empiricism. (p. 454.)[r] The account given by M. Littré of the medical practice of Hippocrates, is extremely meagre, nor do we quite understand why he reckons the treatise *De Ratione Victus in Morbis Acutis* as a work on therapeutics, (indeed, as the

[r] For a further explanation and development of this subject, our readers must be referred either to the 'Prognosticon' of Hippocrates himself, or to M. Littré's able introduction to that treatise in his second volume.

only work by Hippocrates that we possess on this subject, p. 461,) when he begins the argument prefixed to it (vol. ii, p. 192,) by saying that its object is not to explain the treatment of acute diseases in general, but only to touch on one particular point of practice, viz., the diet of the patients. We cannot, however, attempt to supply the deficiency here, farther than by saying that the medical practice of Hippocrates appears to have been very much what might have been expected by any person acquainted with his system of pathology; in short, it consisted chiefly in watching the operations of Nature, and promoting the critical evacuations mentioned above—a plan of proceeding sufficiently cautious and inert, but which, (as Dr. Bostock remarks,) considering the state of medical knowledge at that time, must be admitted to be much more salutary than the opposite extreme.

With regard to the medical character and style of Hippocrates, (which forms the subject of the last chapter, pp. 465-78,) although he says little or nothing expressly about himself, and exhibits in this respect, a striking contrast to the interesting loquacity and egotism of Galen, yet it is impossible to avoid drawing certain conclusions from the characteristic passages scattered through the pages of his writings. He was evidently a person who had not only had great experience, but who also knew how to turn it to the best account; and the great number of moral reflections and apophthegms that we meet with in his writings (several of which have acquired a sort of proverbial notoriety,) show him to have been a profound thinker. He loved his profession, and was jealous for its honour, (pp. 467-8,) while for every species of quackery and charlatanism, he had the utmost aversion and contempt. (*pp.* 469-70.) He appears also to have felt the moral obligations and *responsibility* of his profession, and often tries to impress upon his readers the duties of care, attention, and kindness towards the sick, saying that a physician's first and chief consideration ought to be the restoring his patient to health. (p. 467.) His style is (as every one knows,) so concise as to be sometimes extremely obscure; though this charge, which is as old as the time of Galen, is often brought too indiscriminately against all the works of the Hippocratic Collection, whereas it applies, in fact, especially only to certain treatises which seem to be merely a collection of notes. (p. 473.)[1] In those writings, which are universally allowed to be genuine, we do not find this excessive brevity, though even these are in general by no means easy.

M. Littré concludes his Introduction with some excellent observations on the study of the ancient medical writers, (p. 475, &c.,) which we cannot well abridge, and which we have not room to translate, but which seem to us to suit exactly two classes of persons, viz., those who imagine on the one hand, that an ancient treatise on medicine can by means of certain explanatory and corrective notes be made to supersede the use of a modern work on the same subject; and, on the other hand, that much more numerous class (including some celebrated names, both of the last and the present generation,)[2] who find it easy and convenient to

[1] Such as 'De Humoribus, De Alimento, De Officina Medici,' &c.
[2] An instance of this is mentioned in our last April Number, p. 439.

sneer at learning, which they do not themselves possess, and therefore, from sheer ignorance, believe their forefathers to have been only egregious blockheads.

The Introduction is followed by an Appendix, treating of the Ionic dialect as it appears in the works of Hippocrates, (pp. 479-502,) of the editions published by the ancients, (pp. 502-11,) of the MSS. in the libraries at Paris, (pp. 511-40,) and of the modern editions and translations of the whole Collection. (pp. 540-54.) This, however, as being probably uninteresting to the greater part of our readers, we must omit, though we should be glad to see the question of the dialect examined at length by some scholar competent to the task. The remainder of the volume (pp. 557-637) is taken up with one single treatise, (*De Antiqua Medicina,*) to which is prefixed an argument, containing all the information necessary for the due understanding of the work. M. Littré's second volume begins with an Advertisement, (pp. v-xlviii,) in which he examines some works connected with the Hippocratic Collection, which were not published, or which he had not seen, at the time of the appearance of his first volume: one of these is M. Petersen's Dissertation, of which we have already given some account. The treatises contained in the second volume are, *De Aëre, Aquis et Locis, Prænotiones, De Ratione Victus in Morbis Acutis,* and the first book *De Morbis Popularibus,* all edited and translated on the same plan, and with the same care. The third volume also contains an Advertisement devoted to the examination of some works which the editor had not before seen, (pp. v-xlii,) and four of the works of Hippocrates, viz., the third book *De Morbis Popularibus, De Capitis Vulneribus, De Officina Medici,* and *De Fracturis.* The fourth volume we have seen advertised, but, though we have inquired for it more than once, we have not yet been able to obtain it; we therefore thought it due both to M. Littré and to ourselves, to delay the notice of his work no longer. Our general opinion of it has been already expressed: that it will supersede the necessity of a new edition for the next fifty or even twenty years, we are far from venturing to affirm; but that it is (as far as it goes,) the standard critical edition, that it does more towards settling the text than any that has preceded it, and that its use is indispensable to every physician, critic, and philologist, who wishes to study in detail the works of the Hippocratic Collection, we can assert without much fear of contradiction.

ART. XII.

Principles of Medicine; comprising General Pathology and Therapeutics, and a brief general view of Etiology, Nosology, Semeiology, Diagnosis, and Prognosis. By CHARLES J. B. WILLIAMS, M.D. F.R.S., Professor of the Principles and Practice of Medicine, and of Clinical Medicine, and First Physician to the Hospital, University College, London, &c. &c.—*London*, 1843. 8vo, pp. 390.

To the philosophic inquirer into the progress of the human intellect, the revolutions of science afford a no less interesting subject of contemplation, than that presented by the revolutions of empires to the observer of the social improvement of the human race. The change of a dominant *opinion* produces as great an influence upon the actions of the mass, as the change of a *government*,—often a much greater. We do not know how much we are influenced by the principles we have espoused until we meet with others who are acting on principles exactly opposite, or find it necessary to exchange our own for some others of a very different tendency.

In no science, perhaps, have so many specious systems at different times obtained the mastery—to be in their turn overthrown by some specious or dogmatical assumption,—or have these systems exerted so great an influence over the actions and belief of those who adopted them, as in Medicine. The cause of this it is not difficult to trace. The apparent simplicity of the phenomena of disease presents great attractions to the superficial generalizer; whilst their real complexity often baffles the utmost skill of the truly philosophical inquirer. In every system, there has probably been a *modicum* of truth, however large the proportion of error with which it was mingled; and the practitioner has been naturally desirous of availing himself of any guide, by which he might simplify his treatment of the ever-varying forms of disease, without troubling himself with a minute diagnosis, or even with a careful application of his remedies to symptoms. Hence the favour which *panaceas* have met with, in all ages, among empirical practitioners *in* the profession as well as *out* of it. And hence the disinclination to the steady pursuit of pathology as a science, which those who have arrogated to themselves the distinction of *practical* men, have both manifested in their own persons, and endeavoured to impress upon others.

"It seems quite extraordinary," says Dr. Williams, "that notwithstanding the recent rapid improvements, and comparative perfection of the contributory sciences, practical medicine should still halt in the domain of empiricism. A chief cause for the anomaly seems to be, that science and practice have been rarely pursued by the same parties. Scientific men are not and cannot be practical, because they have had no experience; and practitioners know little of science, and therefore derive little good from it. Instead of working together, these parties are at issue with each other. But it is high time to put an end to this feud. Philosophers must descend from their transcendental positions, to consider details of practice and purposes of utility. Those who would be practitioners must gain from science that knowledge and that method which renders experience instructive and useful." (Preface, p. 6.)

A better era, however, is dawning upon Medicine. The study of pathology as a science is no longer regarded by those whose opinion is most influential, as producing an incapacity for the practice of medicine; and it is now universally acknowledged that no real progress can be

made except by the accumulation of appropriate materials, which shall be built up, course upon course, by the regular process of inductive generalization. This process has been going on among many of the most profound and sagacious minds of our own country during the last few years, to a degree of which few, save those who have carefully watched the indications of it, are in the least aware; and the work before us may be regarded as its first complete manifestation. We hail its appearance, therefore, not only on account of the value we are ready to attach to any production from the pen of its accomplished author, but also as the indication of a vast improvement in medical teaching, which must operate most favorably, at no distant date, on medical practice, besides giving a stimulus to many active and intelligent minds, to follow out the line of inquiry, which it has so successfully opened. The detailed examination on which we shall presently enter, will show that our anticipations are not too high; and that the work before us possesses the strongest claims on the attention of our readers.

Before proceeding to it, however, we must stop to notice the remarkable *phase* which pathological science is now assuming. We can scarcely suppose our readers ignorant of the fact, that everything now tends towards a revival of the humoral doctrines of a past age, to the overthrow or modification of many of the opinions regarding disease, which have in these later times more generally prevailed. But there is this difference between the humoral pathology of the present day and that of our ancestors: The latter was adopted as a hypothetical system, based on a very limited induction; and when once adopted, *all* phenomena were explained in accordance with it. The humoral doctrines of the present day, on the other hand, are adopted by philosophic minds, *only* so far as they are *required* by an induction from the combined results of chemical and microscopical inquiries into the constitution of the blood, and observation of the phenomena of disease; and are not entertained by any means to the exclusion of the idea that morbid actions originate, in a great variety of instances, in the solid parts of the fabric, and communicate their influence to the blood. This will be shown to be generally the case in one of the most important of all diseases—inflammation; which, on account of the peculiar interest that attaches to it at the present time, will be discussed in a separate article in our next Number.

After an excellent introduction on the need of *principles* in medicine, (which, however, we should have preferred seeing recast from the form in which it was delivered as a lecture, into one more consonant with the rest of the work,) Dr. Williams proceeds with the subject of Etiology, which occupies the first chapter of the treatise. As this part of the work is necessarily, from the fulness with which the topic has been discussed by other authors, not so original either in its plan or in its treatment as most of that which follows, we shall dismiss it with the remark that it is most admirably executed, and shows its author to be fully acquainted with all that has been ascertained on the subject,and to have carefully weighed the various theories in which the present epochs are so rife.

The introduction to the second chapter explains the plan and objects of the treatise so fully, yet concisely, that we cannot do better than transfer the whole of it to our pages.

"Disease is a change from the natural condition of the function or structure of

the body; but the change is generally more or less compound, involving several elementary functions or structures; and it is obvious that we cannot obtain an accurate knowledge of the nature of disease, until we have ascertained that of its component parts. As the anatomist and physiologist examine structure and functions, by separating or analysing them into their constituent parts, before he contemplates them in combination, so should the pathologist study these constituent parts, or elements, in *disease*, before he can understand their combinations."(p. 47.)

We quite accord with Dr. Williams in the following opinion, which is put forth in a note to the preceding passage, but which seems to us of sufficient importance to be transferred to our larger type. "A neglect of this precept has greatly retarded the advancement, nay, even the formation, of pathological science. Men have begun with the very complex problems of *inflammation* and *fever* before they have made themselves acquainted with the elementary properties of textures, or even of vessels. The result has been, that the most profound reasoning and ingenious speculations have been wasted on non-entities, such as spasm of the extreme vessels, increased action of the capillaries, &c.; and even observation has been confused by the complexity of the subjects brought under it." Although there is unquestionably no *single* alteration of function, which can be compared in the frequency of its occurrence, and in the importance of its results with inflammation, yet a knowledge of its characters and effects is by no means that "one thing needful" to the physician which is commonly supposed; since many other functional alterations and structural lesions are entitled to rank with it in a *scientific* point of view, and are *collectively* of even greater *practical* importance. If our readers have any doubts on this subject, we think they will find the resolution of them in the treatise before us; our quotation from which we now resume.

"The chemist, in the examination of his subjects, finds that there are some principles or elements that cannot be analysed or divided further; these he calls ultimate or primary elements: others, again, are simple compounds, which may be analysed; but they occur so constantly, and act so singly in compounding and giving properties to complex matter, that they are called proximate principles or secondary elements. A parallel case might be shown of physical science. So should it be with physiology and pathology.* There are the healthy and diseased *primary* or *ultimate elements* of *structure*,—muscular fibre, nervous matter, vascular fibre, and the elementary tissues of membranes, glands, skin, and other parts; and there are *primary* elements, healthy and diseased, of *function* of these same structures—irritability, tonicity, nervous properties, to which may be added, because at present we cannot analyse it, the power of secretion and nutrition; and, lastly, the constituents of the blood. And there are the *secondary* or *proximate elements* of disease, composed of the preceding primary elements, but still simple in comparison with the complex conditions of disease, which they combine to produce.

* Dr. Williams adds in a note—"I have pursued this synthetic mode of teaching general pathology, in my lectures, during the last three years. I am not aware that it has been fully used by any other writer, although several (as Andral and Carswell) have partially recognized it in their divisions of the objects of morbid anatomy; and my friend Dr. Symonds has adverted to the parallel of chemistry, and actually employed the term *proximate principles of disease* in the same sense in which I use it." We believe that Dr. Symonds is fairly entitled to whatever merit may attach to the first application of this term, and to the suggestion of the train of ideas consequent upon it; his pathological introduction to Dr. Tweedie's Library of Medicine having been *published* in 1840, and probably written a year or two previously, as we have reason to know that its publication was delayed by the incomplete state of the rest of the work.—Rev.

"The following are the chief of these proximate elements: the blood-vessels and their different conditions, anemia, plethora, congestion, determination of blood, and inflammation; the nervous system, with its different functions, sensation, volition, reflected excitement, sympathy, and irritation; the secreting organs and membranes, with their relations to the vessels, the nerves, and to the purposes which the secretions serve in the animal economy; lastly, (and here we must drop physiology, for the subject is peculiar to pathology,) the elements of structural diseases, new formations, and parasitic creatures.

"These with a a few more of less importance, constitute the secondary or proximate elements of physiology and pathology; we have to consider them in relation to pathology only.

"These primary and secondary elements of disease are the especial subjects of general pathology. By the study of them we become acquainted with the materials of disease, and their relations to each other; we learn how special diseases arise, and of what they consist; how they produce their phenomena and effects, how they are to be known, distinguished, and classified. Out of such a knowledge, where it is correct, sufficient, and combined with an ample acquaintance with the properties of remedial agents, arises the rational method of curing, relieving, and preventing disease, the great ends of the art of medicine.

"I readily admit that our knowledge of these elements, these principles in pathology, is as yet too limited to be entitled to rank as a science; but I think that the attempt to describe and illustrate them will be useful, not only by making available all that is known on the subject, but also by showing what is not known, and needs investigation: these suggesting fit subjects for further research." (pp. 47-9.)

We most fully accord with Dr. Williams in these closing remarks. If no attempts are made to give to Pathology a really scientific form, it must ever remain the rude mass of heterogeneous materials, which it has until recently been. The *first* attempts must necessarily be imperfect; the *second* will be less so; and every succeeding well-directed effort will lighten the difficulty of reducing the mass of phenomena to order and arrangement. None but those who have been themselves engaged in scientific pursuits, can fully appreciate the value of these endeavours. An idea, suggested by one, in relation to a class of facts with which he is more particularly conversant, is taken up by another, and applied by him through a more extensive range. Or it becomes the indirect source, in the mind of that other, of a new mode of contemplating facts which had long been familiar to him; and thus enables him to find the hidden cord that bound them together, and to reach the mysterious principle to which they lead. We regard Dr. Williams's treatise as eminently *suggestive*; and we doubt not that its good effects will be speedily manifested; so that, by the time when a new edition is called for, many of its *lacunæ* will be filled up. These, however, are really less considerable than we had anticipated; for the materials supplied by the combination of the extensive reading and complete practical knowledge possessed by the author, and elaborated by his sagacious and philosophic mind, have rendered his modest "attempt" far more successful than we had ventured to anticipate that it could be, in the present unsettled state of opinion. We believe that one great secret of this success is his adoption of a sound and consistent physiology. His knowledge of this subject is quite *au courant* with the time; and he is fully alive to the importance of all the light which an acquaintance with the normal functions of the animal body can throw upon its morbid phenomena. We shall now proceed with our analysis.

The *first* of the primary elements, noticed by Dr. Williams, is Muscular

Irritability or Contractility: which is considered under the heads of *excess* and *deficiency*. We need not detain our readers on this section, however, as it contains no particular novelty; but we would mention that the account of the disorders of this function is based on what we believe to be the true view of its normal character,—that, namely, which regards it as an independent attribute of muscular structure.

The *second* of these elements is Tonicity; and as the operations of this property are not generally understood, we shall give our author's account of them. It may be defined as a tendency to slow, moderate contraction, not essentially terminating in relaxation; but it keeps the parts in which it resides in a certain degree of tension. This property is possessed by all muscular parts, and by some which are hardly accounted muscular. It is particularly vigorous in the lowest forms of muscular tissue, as in the fibrous coat of the arteries, and in the dartos; and in the arteries it has the function of adapting them to different degrees of fulness, whilst maintaining a certain tension favorable to equality in the motion of the blood.

"It has been asserted, that tonicity is quite distinct from irritability; and [that] although irritable fibres possess tone, tonic textures are not irritable. This is not true with regard to the arteries; for I have many times distinctly seen them slowly contract, and remain contracted, at a point to which an irritant—mechanical, chemical, or electric—has been applied. The late discovery, by Henle, of a structure distinctly muscular in arteries confirms this observation. I have proved, in like manner, the irritability of the air-tubes, which move more readily under a *stimulus* than the arteries; whilst that of the intestines is still higher in degree, but still inferior to that of the œsophagus and voluntary muscles, the contractions of which, on the application of a stimulus, are abrupt, and immediately followed by relaxation. So far, then, it appears, that tonicity is influenced by the same agents which excite irritability; but another agent, temperature, seems to affect them differently. Cold increases tonicity, and impairs irritability; whilst heat diminishes tonicity and increases irritability. Under the influence of cold, arteries shrink in size very remarkably;* and the muscles and other textures present a firmness and contraction which impede the quickness of motion characterizing the highest degrees of irritability. Under the influence of heat, on the other hand, although muscles are relaxed, they are more irritable, and the pulsations of the heart are more frequent.

"Cold and heat, therefore, become the best tests for tonicity; and by their means we find this property to be possessed by textures which have never been proved to be irritable; I mean the veins and the cutes, which contract by cold, and become relaxed by heat." [Regarding the non-irritability of the veins, Dr. Williams is in error; since Valentin has excited contractions in the vena cava by irritating the sympathetic nerve; and their fibrous coat, though not so distinctly muscular as that of the arteries, is yet more analogous to the non-striated muscular tissue, than to any other. The same may be said of the skin; and especially of the dartos.]

"Now this property, tonicity, is a very important one in the animal economy; its natural condition being very necessary for the preservation of health, and its modifications being concerned in causing and constituting disease. Practical men have long admitted the existence of something of this kind, without defining or localizing it; and the terms tone or atony, bracing and relaxation, tonic and relaxing remedies, become quite appropriate in connexion with this property." (pp. 53-4.)

* This fact must be familiar to every one who has noticed the difference of the pulse when a limb is cold and when it is warm. But I have seen it more forcibly illustrated by experiment. On plunging into cold water the aorta of an ass just dead, it contracted so closely as to obliterate its cavity; and it required some force to pass the little finger into it. The crimping of the flesh of fish is referrible to the same principle.

There is an *excess* of tonicity in the state commonly termed "high condition;" in which there is predisposition to disorders of a sthenic kind, but less than usual tendency to infectious disorders, and others of a depressing character; and this excess is marked by a pulse which is strong, tense, and even slow, but which is felt at the wrist synchronously with the heart's impulse. It is regarded by Dr. Williams as a chief constituent of inflammatory fever; and the remedies best suited to it are those which relax the tonic fibre and increase the secretions, together with some which seem to have a specific power of reducing it, such as antimony. We shall quote the account of defective tonicity in full; as an excellent example of the influence of sound physiological knowledge, in affording the rationale of morbid phenomena, and directing the application of remedies to their cure. We might venture to predicate, from the simple *datum* of defect of tonicity, nearly all the results which Dr. Williams enumerates as attributable to it; and to direct that treatment, which experience has shown to be most efficient. But we think that there is danger in dwelling on it too exclusively as an element of disease; since it is probably, in a great majority of instances, if not in every one, dependent upon *previous* faults of nutrition; and forms part of a complex morbid state, which renders the subject of it an easy prey to such morbific agents as malaria, &c., whose primary influence must be exerted on the blood or on the nervous system, and of whose action the body is most susceptible when *these* are in a condition below that of health. And it is further to be remembered, that, with the exception of cold, our chief tonics operate rather upon the blood and the nervous system, than upon the fibrous coat of the arteries.

"Where tonicity is defective, the muscles are flabby and incapable of continued exertion, but are sometimes too irritable, with the tremulousness of debility. The heart likewise is irritable, and often exhausts its strength in palpitation; the pulse is soft and unsteady; it may be full when slow, but it is without strength, and easily accelerated. Its most distinctive character, however, is its retardation, increasing the interval between the heart's beat and distant pulses; so that the radial pulse is often felt after the second sound of the heart is heard; the tubes being less tense, the pulse wave is slower than usual. So, too, the loose relaxed state of the vessels renders the circulation in distant parts weak, so that the extremities are cold, whilst the head may be congested. Sudden exertion or change of posture may disturb the circulation, and cause faintings or giddiness. Want of tone also in the stomach and intestines causes indigestion and costiveness, and permits them to become distended with wind and accumulating fæces. The secreting organs, irregularly supplied with blood, are also liable to disorder, being either scanty, depraved, or profuse and watery.

"It is quite obvious that a person in such a condition must be prone to various diseases. He has no resisting power against malaria, infection, or other depressing agents. If he is exposed to cold, the blood is readily driven through the weak vessels into the interior, where it causes congestion or inflammation. The weak intestines have no power to expel offending matter from them. Thus the system, in a state of atony, is liable to the action of many exciting causes of disease; besides being itself in many respects on the verge of disease.

"*Remedial measures*. The proper remedies in such a condition are tonics, or those agents that tend to increase the tone of the system, particularly of its muscular and vascular parts. We have already stated, that cold has this effect in a marked degree; and in truth cold, properly applied, is one of the best tonics which we possess. For this purpose its application should be sudden and too brief to cause depression or any of its morbid effects. The shower-bath and plunge-bath are the most effectual forms; and free sponging with cold salt water, is ap-

plicable even to weak subjects. A pure bracing air, and much exposure to it, have also useful tonic effects. There are many medicinal tonics, the most effectual of which are bark and its preparations, medicines containing iron, and the mineral acids. Generous living may be considered a part of a tonic plan, in so far as it tends to supply blood, which is the pabulum of tonicity as well as of other vital properties." (pp. 55-6.)

We think it right to take exception to this last statement; since we cannot conceive the blood to be rightly designated as the *pabulum* of a *property*. It is the material at whose expense those tissues are formed, which exhibit the several vital properties characteristic of them; and to *these* it is the *pabulum*. Were we inclined to be hypercritical, we might notice several other instances of slight inaccuracy in style, which we hope to see corrected in another edition; but we do not wish to draw off the attention of our readers from the excellencies of the production before us, to notice any but really injurious errors.

In the three succeeding sections, which have reference to the elementary Functions of the Nervous System,—sensibility, voluntary power, and reflected and sympathetic nervous influence, we do not find anything requiring special notice; these subjects having been so frequently brought under the special consideration of our readers. We shall only say that Dr. Williams is here, as elsewhere, fully alive to the pathological value of the recent improvements in physiological knowledge; and that Dr. Marshall Hall's doctrines are unreservedly adopted by him.

The sixth section treats of the Diseases of Secretion; concerning which, it is admitted by our author, that our knowledge of the properties of the secreting organs is not yet sufficient to enable us to separate these distinctly, as primary morbid elements, from disordered conditions of the blood, resulting from defect or depravation of the assimilating processes. He is, we think, quite right in the assumption, that whether the function of the secreting organs be that of *conversion*, or of mere *separation*, (the limits between which have not been hitherto well defined by physiologists,) we must attribute their selective actions to vital properties belonging to their tissues. "We are thus led to consider secretion as a peculiar property of the secernent structures, just as irritability is of muscular fibre; and as such its disorder constitutes a primary element of disease. In doing this, we avoid the hypothesis of some physiologists, who ascribe secretion to nervous influence, a notion by no means accordant with numerous facts." Nevertheless, as the nervous system is known to have a considerable influence upon the secreting process, we must anticipate morbid effects from this influence; in the same manner as we consider derangement of the normal supply of blood, as an important element in disorders of secretion. Dr. Williams justly remarks that these disorders will operate in two ways, *forwards*, on the parts to which the secretion goes, and on the function to which it is more or less subservient;—and *backwards*, on the organ, and the blood from which it is formed.

"The *forward* effects of an excessive secretion of bile depend on its stimulating properties. It irritates the intestinal tube, causing a bilious diarrhea or cholera. The symptoms of this consist in an exaggeration of those properties of the alimentary canal, which have already been described as elements of disease. Thus the irritation of the bile causes increased irritability and more rapid motion of the matter through the tube; pain from exalted sensibility; vomiting, straining, and cramps from exalted excito-motory function; profuse mucous secretion from excited secernent function." (p. 76.)

The *backward* effects of excessive secretion may be exerted either on the secreting organ or on the blood. The vital properties of the organ may be weakened by it; so that a subsequent depression follows its unusual activity, and it becomes torpid. When the excess in quantity continues for a long time the secretion is usually impaired in quality from a similar cause. The blood may have its composition much disturbed by an excess of one important secretion; which will cause an injurious predominance of the secretion that is *complementary* to it. This is especially the case in regard to the bile and urine; an excessive production of either of which, if not balanced by an increase in the other, must affect the composition of the blood injuriously.

"A clinical illustration of this position may be found in cases of bilious diarrhea or cholera. The flux of bile is either accompanied by a highly-loaded state of the urine, or by fever; in the latter case the fever does not subside until the urine becomes very copious, or deposits an abundant sediment. The most probable interpretation of this fact is, that the excessive secretion of the bile disorders the composition of the blood; so long as the kidneys rectify this disorder, by separating in greater abundance the solid contents of the urine, no fever results; but if the kidneys fail in this task, fever ensues and continues until they accomplish it; then a free secretion and copious deposit are symptomatic of the decline of the fever." [Or, we would rather say, *occasion* the decline of the fever.] (pp. 77-8)

The *backward* effects of disorder of the secreting processes on the blood are more remarkable, however, in cases of deficiency than in cases of excess. The peculiar matters of the biliary and urinary excretions are positively noxious when they accumulate in the blood beyond a certain point, and produce all the effects of poisons. Of the extent to which this accumulation may take place Dr. Williams gives a remarkable example from a case of ascites from disease of the heart, liver, and kidneys, in which Mr. Garrod obtained nearly four grains of nitrate of urea from an ounce of the peritoneal fluid, together with a considerable quantity of bright yellow solid matter, probably bilious:

"The excretions are defective in many idiopathic and symptomatic fevers, and there can be little doubt that many of the constitutional effects of these fevers are in great measure due to this important element. The positively noxious properties which excrementitious matter retained in the blood is known to possess, must be taken into account when we attempt to explain the states of constitutional irritation and depression, with perversion of functions, which fevers so generally present. The changes in the blood, manifest in some such cases by its fluidity and by petechial appearances, may also be in part referred to defective elimination of effete matter; and it is when the secreting organs recover their power, and a diarrhea occurs, or a copious discharge of highly-loaded urine, that these appearances cease. I have found purpura to be often connected with hepatic congestion and imperfect excretion of the bile, and to be most effectually removed by remedies which promote the restoration of the proper secretion." (p. 81.)

Defective secretion is of course to be restored by remedies directed towards the correction of an excess or a deficient supply of blood to the part, if the circulation through it be disturbed; and by those which have a specific influence on the secreting structure itself. The following observations on the use of the latter are of great practical value:

"But the specific stimuli of the secreting organs, if used in excess, or too long, may not only cause general weakness, but also exhaust the vital properties which they excite; and the result may be a diminution either of the secreted fluids, or of its most characteristic constituents. Hence the long or excessive use of mer-

cury causes torpidity of the liver; that of purgatives, imperfect action of the bowels; that of diuretics, scanty urine, or albuminous or watery urine, defective in urea. These facts point out the expediency of alternating or conjoining these different agents with others calculated to improve the vital properties of the textures generally, which may often be effected by the medicines called tonic, and by regimenal means which improve and equalize the state of the circulation, and preserve the digestive and assimilative functions in the best order. In illustration of this position I may refer to the acknowledged advantage of giving bitters with or after mercurial courses; chalybeates with or after saline aperients and diuretics, when these are long used; and these additions, which alone or used at first, would check the secretion to be increased, now sustain it and render it permanent. Some medicines which are inferior in efficacy to those already named, are yet, in some instances, more eligible for chronic cases of defective secretion; because they are less exhausting, and combine some measure of tonic influence with that of increasing the secretions. As examples of this kind may be named, taraxacum, preparations of iodine, sarsaparilla, nitro-muriatic acids. Courses of these medicines are sometimes of great efficacy in keeping free the secretions, after they have been restored by more powerful means; and they likewise often improve the functions of digestion and nutrition." (p. 82.)

The morbid alterations in the circulating fluid arising from deficient secretion, are again noticed under the next head—Diseases of the Constituents of the Blood; which are treated as fully as the present state of our knowledge permits. The following introductory observations will give an idea of our author's general views, and mode of treating the subject:

"The pathological elements which we have hitherto considered are those of the vital properties of the elementary solids. We now proceed to examine the morbid changes in the blood. These, like those of the solids, may often be traced *to individual* elements of which the blood is composed; the changes of *which must be* viewed as ultimate elements of disease, and are therefore properly *included in the* present division. But as the blood also operates as a whole—compound, indeed, in itself, but simple in its influence on vital functions and structures—it forms a proper connecting link between *proximate* and *ultimate* elements of disease. So, also, inasmuch as it is, in some respects, an organized compound, the materials of which are changed, together with its functions, and contributes to the production of change of structure in the solids of the body, the consideration of its changes will be a proper introduction to that of alterations in the circulation, which induce changes of structure, and thus lead to structural diseases themselves.

"We have found that blood is the support of all the vital properties; and in describing their variations we have been obliged to refer frequently to differences in the supply or quality of this fluid, both as causes and as consequences of these variations. We have now to examine the properties of the blood itself; and, first, those which are most elementary or referrible to its respective constituents.

"The circulating blood consists of red particles, colourless globules, and liquor sanguinis; but as the latter is compound in function as well as in constitution, it is necessary to specify its chief constituents. We have, then, to consider:

1. The red particles	in excess, defect, and alteration.
2. Fibrin and colourless globules	
3. Albumen and other dissolved animal matters	
4. Oil	
5. Salts	
6. Water	

"Other changes affecting the entire blood are:

7. Changes by respiration.
8. ,, by secretion.
9. ,, by nutrition.
10. ,, by foreign matters.

"The average natural proportions of the chief constituents of the blood, according to Lecanu, and adopted by Andral and Gavarret as a standard, are, 127 red globules, 3 fibrin, 72 animal matter in the serum, 8 salts, 790 water." (pp. 84-5.)

Into the details of this subject we shall not follow our author, but shall content ourselves with remarking that they are treated with great judgment; and that whilst they embody, in a concise form, all, or nearly all that has been satisfactorily ascertained, they are eminently *suggestive* as to the points on which further inquiry is most needed. Take, for instance, the following paragraph on disorders of the red particles:

"Besides changes in colour, the red particles may probably be subject to alterations in their form, size, and other properties in connexion with the medium in which they are placed. It was first observed by Hewson that pure water causes them to swell, become globular, and burst; whilst saline solutions, containing more salts than serum does, make them shrink in size. These changes are now generally understood to arise from endosmosis and exosmosis; the saline matter drawing the water into or out of the little cell which constitutes the red particle. It has not been ascertained, but it is highly probable, that similar changes may take place in the living body, from circumstances which greatly alter the proportion of saline matter and water in the blood. May such change contribute to produce the serious symptoms, and even sudden death, which have ensued on drinking a large quantity of water after great exertion? Has it aught to do with the reaction and irregular excitement sometimes occurring after excessive losses of blood? Or with the symptoms of suffering which animals manifest at the instant of injecting water into their veins?" (p. 88.)

We think that Dr. Williams must have overlooked a valuable paper by Dr. G. O. Rees, in a recent number of the 'Guy's Hospital Reports,' in which the endosmotic action of the red corpuscles, and its great importance in the vital economy have received much additional illustration. In regard to the origin of the buffy coat, Dr. Williams seems inclined to the opinion—in which we accord with him—that it may be due to several different causes. The simple retardation of the coagulating process is sufficient to produce a distinct separation between the colourless and the coloured portion of the crassamentum, owing to the superior specific gravity of the red corpuscles, which have then time to sink to the bottom; "but the fibrin thus rising to the surface has neither the contraction nor the firmness of the inflammatory buff, but is gelatinous, like size, and rather resembles the sizy blood sometimes exhibited in scurvy and diabetes." Moreover, that some other cause than slowness of coagulation must generally operate, is also evident from the facts, that the buff will appear in inflammatory blood, even when it coagulates rapidly, as is sometimes the case in acute rheumatism; and that the separation takes place distinctly where gravitation can have had no influence. Dr. Williams quotes the observation of Mr. Wharton Jones,* that an increased cohesion exists between the red particles of inflammatory blood; and regards it as a valuable fact, "because it furnishes us with a microscopic test of the inflammatory condition of the blood, applicable, as Mr. W. Jones remarks, to a minute drop of blood drawn from a prick of the finger." But he does not think with Mr. W. Jones, that this increased attraction fully accounts for the tendency to separation between the red corpuscles and fibrin, by a sponge-like action of the mass of coherent particles, contracting and squeezing out the fibrin from between them, before it

* British and Foreign Medical Review, October, 1842.

coagulates; "for," Dr. Williams remarks, "I do not consider this comparison a just one; for, so far as I have seen, the cohesion of the red corpuscles is not in an entire mass, but only in separate piles or rouleaux; these would facilitate the separation, not only by contractile aggregation, but also by sinking through the liquid fibrin more quickly than separate particles would; just as bits of chalk fall to the bottom of water, instead of remaining long suspended, as they would do in fine powder." That the increased tendency to aggregation among the particles of the fibrin has at least as much to do with the production of the inflammatory buff as the attraction of the corpuscles, appears to us fully proved by the fact, that the colourless coagulum is much firmer than usual, its fibrous structure much more evident under the microscope, and its subsequent contractions much more powerful. The relations of fibrin to the normal and morbid processes of nutrition, are concisely set forth in the following paragraph; the general views contained in which are expanded in the subsequent part of the treatise:

"Fibrin, or the buffy coat of the blood, is also the material of which new membranes and cicatrices are formed, constituting the *coagulable lymph*, which is the plasma or basis of the constructive or reparative process. But in its capacity for this process fibrin exhibits some varieties. The plasma with which old textures are nourished and new ones formed, is *euplastic* in a healthy state, having a capacity of life: and may become organized in a high degree, as in false membranes resulting from acute inflammation in a healthy subject. But in many instances this capacity is degraded, and the nutritive material is *caco-plastic*, susceptible of only a low degree of organization, as in the indurations resulting from low or chronic inflammation, fibro-cartilage, cirrhoses, gray tubercle, &c.; or it is *aplastic*, not organizable at all, as in pus, curdy matter, yellow tubercle, &c. *It is a point* of great importance that the quantity of fibrin in the blood and the *facility with* which it may be effused are by no means in proportion to its plasticity, or capacity to become organized; thus it is abundant in the blood, and freely effused in the inflammations, of scrofulous and tuberculous subjects, although the products of these inflammations and of nutrition, are commonly caco-plastic or aplastic. It is interesting to observe that in these cases also the red particles are defective in number." (p. 98.)

We regard the question of the means of reducing the quantity and diminishing the plasticity of the fibrin of the blood, when these are in excess, as one of the most important problems in medicine. It has been clearly shown that general bloodletting possesses but little direct control over the process by which fibrin is elaborated; for even large detractions, in a case of acute inflammation, scarcely diminish the proportion which the blood contains in any perceptible degree. The following points, therefore, are well worthy of consideration:

"It would probably be found that purgatives and other remedies which increase much the more solid secretions, diminish the fibrin. A similar property has been ascribed to mercury, to alkaline salts, to iodine, and to antimony. I know of no positive facts in support of this notion, but it is favoured by some analogies, and seems well worthy of experimental investigation. The operation of salts and alkalies in this way was probably suggested by their property of dissolving fibrin out of the body."* (pp. 99-100.)

* "My friend Mr. Blake has made many experiments of injecting various saline and other fluids into the veins; and he has furnished me with a summary of their effects on the blood, as found after death. The blood was found coagulated after the injection of the following matters: Liquor potassæ (firmly); carbonate of potass (firmly); nitrate of potass (firmly, blood scarlet); nitrate of soda; nitrate of ammonia; nitrate of lime;

The following is a suggestion of great practical importance:

"Bloodletting and other general antiphlogistic remedies, if they do not remove local inflammation, may render its products more injurious, by lowering their plasticity, and approximating them to tuberculous and other aplastic deposits. Thus chronic inflammation continuing after the full application of the antiphlogistic treatment, almost surely tends to produce degenerated changes of structure, over which remedial art has little power. In connexion with this subject, therefore, we see how desirable it is that inflammations should be removed before they become chronic; and when there is a risk of their becoming so, it should be an indication to improve the condition of the blood by a tonic and nutritive plan, at the same time that local antiphlogistic measures may be necessary for the lingering inflammation." (pp. 218-19.)

The combination of local depletion with a general tonic and even stimulating plan, though ridiculed by the routine practitioner—who has no idea of any medium between blue pills, black draught, and starvation, on the one hand, and iron, quinine, and generous diet on the other—is one which many of our highest medical authorities have united in recommending in cases of this kind; and we think the rationale of its success offered by Dr. Williams is very satisfactory. "A similar tonic treatment," he adds, "is still more indicated in scrofulous, chlorotic, and other cachectic states, in which the fibrin, though less abundant than in inflammation, is yet copious in proportion to the scanty red particles. Hence the tendency to the deposit of imperfect fibrin, even independently of inflammation." We are inclined to regard the normal proportion of *red* particles as a most important condition of the due elaboration of the fibrin, whether or not they be the real instruments of this elaboration. That the respiratory process to which they minister has a close connexion with the generation of the fibrin, seems evident from the more perfect character of the fibrin of arterial blood, which cannot be reconverted into albumen in the same manner as that of venous blood; and we would suggest it as an interesting subject of inquiry, whether the fibrin of tuberculous subjects does not resemble venous rather than arterial fibrin. The distinction between them, as stated by Scherer, is this: Venous fibrin (as first made known by M. Denis) may be entirely dissolved in a solution of nitrate of potash; and this solution, coagulable by heat, greatly resembles a solution of albumen. But arterial fibrin, or even venous fibrin long exposed to the air, is not thus soluble; and when a solution of venous fibrin in nitre is exposed to the air, a fine flocculent precipitate, having the characters of arterial fibrin, is gradually formed at the surface, and falls to the bottom. The recent experiments of Mulder seem to indicate that the protein of these two forms of fibrin may be in different states of oxidation.

Of the Changes of the Blood by Respiration, which are discussed in section XIII, we need say little; since their usual effects are familiarly

nitrate of baryta; chloride of calcium; chloride of barium; chloride of strontium; sulphate of magnesia; sulphate of copper; acetate of lead; arsenite of potass; nitric acid (strongly); narcotin (firmly); tobacco; strychnia (moderately); conium; hydrocyanic acid; euphorbium; and water in quantity. The blood was not coagulated, or imperfectly so, after injection of caustic soda, carbonate of soda, sulphate of soda, ammonia, nitrate of silver, sulphate of zinc, sulphate of iron, phosphoric acid, arsenic acid, arsenious acid, oxalic acid, infusion of galls, of digitalis, alloxan. Some of these results are different from what might have been expected; instance the decided coagulation with potass and its salts, especially nitre, and the fluidity with nitrate of silver, sulphate of zinc, infusion of nutgalls, which have been commonly supposed to possess a coagulating property." (pp. 100.)

known, and it is doubtful how far they can be disordered in any other way than by *deficiency*. On the idea of Liebig, that excessive oxygenation of the blood may be a cause of disease, Dr. Williams makes the following judicious remark:

"It seems to me that Professor Liebig has given too mechanical a view of the change of the blood in respiration. He appears to consider the increased arterialization of the blood, during exercise and on exposure to cold, to be a necessary consequence of the greater amount of air inhaled, in one case by accelerated movement of the chest, in the other by the greater density of the cold air. But if the extent of the changes wrought by respiration were in exact proportion to the quantity of oxygen received into the lungs, how easy would it be to increase them (and thereby animal heat also,) by voluntarily augmenting the respiratory movements. I cannot but think that the proportion of oxygen absorbed, and of carbonic acid formed [given off?] depends more on the condition of the blood brought to the lungs; and that the respiratory movements are regulated by this. Thus the increased oxygenation of the blood is a consequence, not a cause, of previous changes previously wrought in the blood itself." (p. 108.)

In this last sentence there is an error, of which a captious critic might take advantage; for how can anything be a *cause* of *previous* changes? The meaning, however, is quite obvious. Dr. Williams regards the changes taking place in the lungs as only the *exponents*, so to speak, of the changes taking place in the systemic capillaries; the former having for their object to balance, by alterations of a converse nature, the effects produced by the latter. In this we fully agree with him; being satisfied that any attempts to account for phthisis, for example, upon the supposition of an increased oxygenation of the blood, *causing* more rapid disintegration of the tissues, will lead us away from the right line of *inquiry*,—the state of the nutritive processes, on which the perfect formation of the tissues, and its greater or less tendency to disintegration are dependent.

We think that the section on the Changes of the Blood by Secretion, might have been somewhat extended with advantage, by a fuller notice of various recent inquiries, which rightly fall under this head. Thus, Dr. G. O. Rees's paper, already adverted to, furnishes some views of great importance in regard to the influence of the state of the blood in producing albuminuria; and their action of the disease, when established, upon the condition of the blood. His idea that the albuminuria which occurs after scarlatina, is due to the complete obstruction to the perspiration, which the state of the skin produces—whence are occasioned increased determination to the kidneys, and dilution of the liquor sanguinis by the retention of the watery part of the blood—strikes us as extremely ingenious; accounting, as they do, for the absence of the serious results which we should naturally expect to follow such an indication.

We have only room for one extract from this section:

"The *perspiratory secretion* contains lactic acid and lactates of soda and ammonia, which probably proceed from the transformation or decay of the textures, particularly the muscular. Hence these products abound during great muscular exertion; and when perspiration is checked by extreme cold, they may be retained in the blood, causing rheumatism, urinary disorders, or various cutaneous diseases. The very serious effects sometimes resulting from sudden cold on the perspiring body may be partly owing to the same cause, as well as to the disorder produced in the circulation. Rheumatism is especially liable to occur as an effect of cold, where the body is fatigued with much muscular exertion; and I have frequently observed that the rheumatism chiefly affects the limbs which have been

most exercised. Where the skin fails to excrete, an increased task is thrown on the kidneys, whence may result various diseases of these organs; and if these organs fail in the task, the lactic acid accumulates in the blood, and, probably acting as a ferment, causes the formation of more, and of the kindred products, lithic acid and its compounds: these, in inflammatory subjects, excite rheumatic fever and, in more torpid frames, various rheumatic or gouty affections. All these cases are frequently remarkable for the acid character of the cutaneous and renal excretions.

"The remedies for rheumatism, therefore, should not be merely antiphlogistic, but also of a kind calculated to eliminate the morbid matter from the blood. In slight cases sudorifics may suffice, but in others the kidneys and liver should also be excited to assist in the process of elimination; and various combinations of colchicum and alkalies with mercury, opium, and iodide of potassium will generally effect this very satisfactorily."* (pp. 115-16.)

We would add to this a strong recommendation in favour of the hot-air bath, which we have known, since our former notice of its effects, (vol. XVI, p. 471,) to produce most beneficial results.

In the following section, on the Changes in the Blood from the Transformation of Chyle and of the Textures, Dr. Williams has confined himself to the two remarkable states on which chemistry has recently thrown so much light—namely, *gout* and other *lithic acid diseases*, and *diabetes.* His opinions on these are quite in accordance with the views we have ourselves expressed in former articles; and he considers, as we do, that there is a danger of pushing merely chemical explanations further than they are borne out by the actual phenomena of disease. That he has done wisely in abstaining from introducing into this section many of the hypothetic views in which the last two or three years have been so fruitful, we are well assured; knowing their seductive influence on the mind of the student.

The last division of the Primary Elements of Disease, includes the changed properties of the blood, from the presence of foreign matters; a topic of the most extensive kind. Too little is yet certainly known, however, respecting the mode in which these foreign matters are introduced into the blood, and the effects which they produce upon its character, to enable much more to be stated than the following:

"The blood is probably the chief seat of the morbid poisons which excite various contagious, epidemic, and endemic diseases. Probably, too, it is the hotbed in which some of them are propagated; and it is through changes in its composition, that many of the destructive effects of these poisons are produced. We have already noticed some of these changes under former heads. It will suffice in this place to mention a few examples, in which morbid poisons have been traced to the blood .... There is good reason to suppose that purulent matter, and the germs of carcinoma and other forms of malignant disease, are spread through the system through the medium of the blood. The tendency to symmetrical arrangement which cutaneous eruptions, nodosities of the joints, paralysis from lead, and some other local affections exhibit, has been adduced, by Dr. W. Budd and others, as an instance of effects produced through the medium of the blood,—the symmetrical distribution of this fluid on the opposite halves of the body leading to like results in corresponding parts." (pp. 121-2.)

* "The advantages of this due regard to all the elements of disease in the treatment of rheumatism may be shown by the fact, that, with few exceptions, I have found that three or four days suffice to remove the fever and pain in the severest forms of acute rheumatism." (p. 115.)

The following judicious observations conclude this division of the work. It is interesting to observe, how completely the science of the pathologist and the experience of the practitioner are now agreed in the propriety of drawing off the "peccant humours" from the circulating fluids, by remedies which act through the natural excreting processes. We would suggest as an addition to Dr. Williams's remarks, whether the practitioner should not choose as his special "emunctory," in each form of disease, that excreting organ, which appears to have a natural tendency to eliminate the particular kind of morbid matter from the blood; thus rather aiding the efforts of Nature, than attempting to set up an altogether new kind of action in the body:

"In the treatment of this element of disease, foreign morbific matters in the blood, the two indications which present themselves are: 1, to counteract the injurious operation of these matters; and 2, to expel them from the system. The first of these indications is followed, when we give stimulants to overcome the depressing influence of adynamic fevers and other sedative poisons; and when opium and other narcotics are administered where irritation prevails. We do not possess chemical antidotes which can act on the foreign matter in the blood, without injuring the blood itself. The other indication is more generally pursued, although little recognized by practitioners, to expel the offending matter from the system. The excretory organs, especially the kidneys and alimentary canal, are the natural emunctories through which foreign and offending matters are expelled from the blood; and hence the utility of alterative aperients and diuretics in the treatment of fever and other diseases connected with poison or injurious matter in the blood. Orfila found that the pernicious effects of small repeated doses of arsenic in animals might be averted by giving at the same time a diuretic medicine. Let us bear in mind how often fevers and other *serious* ailments seem to be carried off by spontaneous diarrhœa, diuresis, or *perspiration*; and, perhaps, sometimes by these discharges artificially *excited. Nor* should a converse fact be overlooked, that persons affected with disease of the kidneys (cacoplastic degeneration) which impairs its excernent function, are peculiarly liable to contract infectious diseases, and to suffer from their effects." (p. 122.)

We now pass on to our author's next division; which includes the Secondary or Proximate Elements of Disease, consisting of two or more Primary Elements. Of these *proximate elements*, the class most generally studied comprehends those which relate to the circulation of the blood; and here we find at least three of the primary elements already noticed, to be concerned: the blood and its constituents, the muscular action of the heart by which it is impelled, and the tonicity of the arteries which regulates its distribution. To these we might add, the functional state of the organs to which it is distributed. The first subject considered is *General Anemia;* a state with which our readers must be very familiar. One of its most remarkable features is the functional excitement of the nervous system, which so frequently manifests itself, and which so strongly resembles that occurring under an entirely opposite condition of the general system. No explanation of this apparent anomaly has been proposed; but Dr. Williams suggests one, which we think well deserving of consideration. When the mass of the blood is reduced in quantity, the blood-vessels of the body at large contract in similar proportion, their tonicity adapting them to the amount of their contents. But the blood-vessels within the skull and spinal canal cannot contract with the same facility; for not being ex-

posed to atmospheric pressure, and some of them being fixed in bony canals, they do not shrink as the blood becomes reduced, and therefore they retain more than their proper share of the circulating fluid. This statement is not invalidated by recent experiments of Dr. G. Burrows (Medical Gazette, April, 1843.) His experiments and observations very satisfactorily demonstrate the absurdity of the notions, founded on Dr. Kellie's paper, that the quantity of blood in the head is always the same; but it remains clear that the circulation within the head and spinal canal, especially in man, is affected by losses of blood, differently from the circulation in other parts. Now this disproportionate amount of blood in the nervous centres produces different effects, according to the degree in which the heart's propulsive power reaches it. Under the influence of palpitation, fever, or other kind of excitement, the brain and spinal cord receive through their uncontracted vessels an unusual share of the force of the heart; an erethism of some one or other of the functions of these nervous centres is the consequence; and pain, spasm, sensorial disturbance, or sympathetic irritations of some kind or other occur. There seems to be the same *disproportion* between the circulation in the nervous centres and that of other parts, in the state of anemia, as there is when the total amount of blood is normal, but an excessive determination of it exists towards these parts. That this disproportion should be greatly increased, by a very slight excitement of the heart's action, will be evident from the consideration that when the arteries are full and tense, they oppose their fulness and tension to each contraction of the heart; which resistance reduces the strength of each pulse in the vicinity of the heart, although it contributes to propagate it to a distance; but when the arteries are loose and empty, the heart squirts the blood into them in an unresisted jet, the force of which is strong near the heart, but extends not to distant arteries. This idea is further applied by Dr. W. to explain the increased arterial pulsation of other parts *near* the heart, in anemic subjects,—giving rise to the painful throbbing often complained of in the throat, chest, and epigastrium,—even when there is little pulse in distant arteries, and the extremities are cold.

But such a state of circulation will not only produce nervous excitement when the heart's action is but slightly increased, but undue depression of the nervous functions when it is feeble. For it may be then inadequate to propel the blood accumulated in the vessels of the brain; the blood therefore stagnates, and may cause some of the symptoms of congestion in that organ, the accumulation being greatest in the veins and sinuses, and the motion of the fluid not being at all proportionate to its quantity. Such congestion may be only temporary, and may lead to no serious results; but Dr. Williams thinks that in some cases a coagulation of blood in the sinuses, and a consequent permanent obstruction to the passage of the blood through the vein, may be the result. He states that he has met with at least three cases of the following description.

"A young female becomes anemic, and after exhibiting various symptoms of feeble general circulation, with headach, drowsiness, and impaired sensorial functions, suddenly becomes worse; passes into a state of stupor, with dilated pupils, sometimes varied by slight manifestations of delirium, throbbing of the

carotids, and partial heat of the head, and dies comatose. On opening the head a small quantity of serum is found under the arachnoid and in the ventricles, sometimes with a little lymph (in one case there was none.) The vascularity of the membranes is remarkable, but the vessels most distended are the veins; and in the larger of these, and in the longitudinal sinus, there is a firm coagulum. In parts, especially at the torcular hierophili, this coagulum blocks up the whole sinus, and exhibits a separation of fibrin, portions of which are softened down into that purilaginous matter which was long mistaken for pus, but which Mr. Gulliver has shown to be a physical change of the fibrin which mere stagnation may effect. These have been taken for cases of meningitis. No doubt inflammation does supervene in them occasionally; but in two cases that have fallen under my notice, there was no adhesion of the arachnoid nor deposit upon it, nor any other unequivocal mark of inflammatory action; yet the fibrinous and bloody concretions in the veins and sinuses were the most remarkable for their size and firmness.

"It appears to me most probable that these affections originate in the encephalic congestion connected with anemia. Fibrinous concretions form on the transverse bands of the sinuses, and increase till they considerably obstruct the passage of the blood: hence the impaired state of the cerebral functions, amounting at last to coma. Reaction may take place with determination of blood, and even inflammation; and these may cause the symptoms of partial excitement that sometimes exhibit themselves; but neither during life, nor on examination after death, are the proofs of excitement so prominent as those of obstruction and interruption to the cerebral functions. It must be remembered that in anemia the fibrin of the blood is not diminished in the proportion of the other animal contents; and it has a greater tendency to coagulate than in healthy blood." (pp. 127-8.)

We have ourselves witnessed a case of this kind, in which, to the surprise of the medical attendant, and the grief of the surrounding friends, a sudden transition took place, from a state which was considered one of mere functional derangement, and expected to be easily subdued in time by well-directed treatment, to one of fatal oppression; no post-mortem examination having been permitted, however, we cannot speak as to the immediate cause of death; but Dr. Williams's rationale of it seems to be very consistent with the symptoms, and with the general state of the system. A representation of the morbid appearances presented by a case, which appears to have been similar in its results, is given by Cruveilhier; but the case was considered by him, as Dr. Williams thinks, without sufficient reason, to be one of cerebral phlebitis. We think it worthy of consideration, however, whether some degree of this affection may not participate in the result; since phlebitis is a disease of frequent occurrence in subjects of an anemic character.

We are compelled to pass on rapidly to *Hyperemia*, under which general term Dr. Williams includes several distinct affections; his arrangement of which, indicative of his idea of their mutual relations, we shall extract:

"Too much blood in the system, or in a part, is a most frequent element of disease. It implies an undue distension of the vessels which contain it; and a modification of the properties of these, and of the heart which propels it, is almost constantly a concomitant of this morbid condition. The chief vital properties of the heart and vessels are irritability and tonicity: excess and defect of these form most important elements, which modify the effects of excess of blood; and thus is suggested synthetically a division (long recognized as most important in practice) into active or sthenic, and passive or asthenic hyperemia, which distinction is appli-

cable to both the general and the partial excess of blood. Another variety of hyperemia may be distinguished by an altered or perverted action of the vessels which is chiefly applicable to the affection in a part, and includes that singular and complex condition—inflammation. A view of these important proximate elements of disease is given in the following table. It is not meant that the diseased conditions here specified are always separate, or that they consist merely of the elements here stated; but these are their most distinguished parts, and most important in regard to treatment.

			Results.
Hyperemia: excess of blood.	General, *Plethora*	with motion increased = *Sthenic.*	Hemorrhage,
		with motion diminished = *Asthenic*	Flux,
	Local.	With motion diminished = Congestion	Dropsy.
		" increased = Determination of blood	
		" partly increased, " partly diminished = Inflammation.	(p. 132.)

We are disposed to question whether the difference between the *sthenic* and *asthenic* forms of plethora consists *alone* in the different proportions of the strength and irritability of the moving fibre, as Dr. Williams seems to think. (p. 134.) It appears to us to depend at least as much upon the state of the blood, in regard to the proportion between its different constituents; and upon the relative activity of the formative process concerned in nutrition and secretion, which results from the degree of the vitality of the solid tissues, and which seems to us to be rather the cause than the consequence of the variations in the degree of contractility and tonicity in the heart and arteries. In the *sthenic* form of plethora, we believe the fibrin or plastic element of the blood to be in abundance, as well as the red corpuscles, and the formative process to be active. (This, indeed, is admitted by Dr. Williams, but not in a way which would lead the student to regard it as the essential character of the condition.) Consequently, there is at least as much tendency to inflammation as to hemorrhage; the inflammatory action being liable to occur whenever a lowering of the vitality of a part takes place, whereby the consumption of the fibrin will be diminished. If hemorrhage occurs, it will be in its active form, dependent rather upon a bursting of the vessels by increased pressure from within, than upon the weakening of their walls, which is the character of a passive hemorrhage. Now in asthenic plethora we find both the causes and consequences to be such as indicate a decided deficiency of the fibrin in the blood. It especially affects those weakened by age, excesses, or previous disease; and it tends to produce congestions and passive hemorrhages, fluxes or dropsies, with a general torpid state of the functions, occasionally interrupted by excitement. In this state, as it appears to us, the amount of fibrin is probably low in proportion to that of the corpuscles, and there is less tendency to inflammatory diseases. Hence, although bleeding may relieve this form of plethora, it does not produce the same health-restoring action as in the preceding case; for the deficiency of the fibrin, and the low condition of the formative processes, may require a tonic and even stimulating plan, with nourishing diet, at the very time that blood is being drawn, and the secretions being increased by evacuants, to remove the morbid matters that may have accumulated in the blood, in consequence of their previous scantiness. This is the plan of treatment indicated by Dr. Williams himself, as likely to restore the "lost tone to the over-distended

vessels;" but we doubt if it effects this in any other way than by increasing the production of well-elaborated fibrin, whilst the red corpuscles are brought down to their normal standard by bloodletting; and thus restoring that normal proportion of the chief constituents of the blood, which is essential to the regularity of the circulation, and to the healthy nutrition of the solid tissues.

We think it right to state our opinion, that, on all points connected with the movement of the blood, there is a deficiency in Dr. Williams's reasoning, arising out of his non-admission of any power, independent of the action of the heart and arteries, operating upon the blood during its motion through the capillaries, and either accelerating or retarding its passage. The chief arguments in favour of the existence of such a power we have already recapitulated on more than one occasion; and our limited space prevents us from here entering upon the question in full. We think it right to state, however, that our conviction of the existence of such a power has been strengthened, rather than impaired, by further consideration; and that the denial of it can only be sustained by a very limited survey of the facts bearing upon the question,—the most comprehensive view of these facts being that which affords the strongest support to the position we have assumed. This position is,—that in the lowest tribes of animals, as in plants, a regular circulation of the nutritive fluid is maintained, without the aid of mechanical propulsion, by forces generated during its movement, and dependent upon the changes to which it is subservient; that, as we ascend the animal scale, we find the peripheral force gradually giving place to a central one, created by a muscular organ of impulsion; but that, even in the highest animals, in which this concentration has proceeded the furthest, the *peripheral force* still regulates the distribution of the blood, in such a manner that by its increase in a part it shall cause a local determination of blood, whilst by its diminution it shall occasion a partial or complete stagnation. This view is not in the least inconsistent with the doctrine, that the heart's action, in the higher animals, is adequate to force blood from arteries to veins without any other aid; in support of which doctrine the following experiment by Dr. Sharpey is cited by our author:

"A syringe, with a hæmadynamometer to show the amount of pressure used, was adapted to the aorta of a recently-dead animal, the vena cava being divided. Warm water was then injected, and with a force that raised the mercury in the hæmadynamometer only three inches, the water passed through the capillaries and out of the vena cava. When the pressure was increased, so as to raise the mercury six inches, the flow was very free; and on adapting another hæmadynamometer to the vein, the pressure in this was found to rise as high as three inches. The pressure thus used in the arteries (six inches of mercury) was not greater than the natural pressure in the arteries of the living animal; and the pressure transmitted to the veins (three inches of mercury) was greater than that in the veins of a living animal." (p. 143, note.)

It is not proved by this experiment, however, that the circulation can be maintained by such an amount of pressure with its normal rapidity, which is a most important element of consideration. Nor does any theory of the circulation, which rests upon the heart's action alone as the moving power, explain why the blood moves through the vessels much more rapidly (as from the experiments of Hering and Blake it would seem to do) than the force-pump action of the heart could account for. And

we take exception to inferences drawn from any experiments of this kind, made with water upon the vessels of a dead subject, as not affording results which can be fairly brought into comparison with those afforded by observation of the circulation of blood in the living vessels under a variety of conditions. For example, it has been found easy to make fluid pass from the arteries to the veins of a gangrenous limb after its removal from the body, although no blood would pass during life; and as no mechanical impediment to its passage could be detected, and the heart's action was unimpaired, it seems evident that something was wanting to complete the moving power required. Such a case is very parallel to that of asphyxia, in which a similar stagnation results, not from the death of the pulmonary tissue, but from suspension of the changes involved in the aeration of the blood. Perhaps the most striking proof that some such peripheral aid must operate in maintaining the circulation of blood, is derived from the case of acardiac fœtuses. For even if we receive the ordinary explanation of their circulation, that it is carried on by the heart of the twin perfect fœtus, always (or almost always) associated with the monster, we cannot help admitting the existence of some additional power; since the heart is not found more powerful than usual, although it has double duty to perform, and can therefore only exert half its usual impulsive force upon the blood of each individual; whilst even this half must be exerted at a great hydraulic disadvantage upon the blood in the vessels of the acardiac fœtus. But our position is still further strengthened by the fact, of which we believe that there is demonstrative proof, that the circulation in the acardiac fœtus was, in one case at least, independent of that of the perfect twin. The case we allude to is one of which an account was given by Dr. Houston, at the meeting of the British Association in 1836; of which account a summary will be found in our Second volume. A different explanation has lately been proposed by Dr. Marshall Hall ('London and Edinburgh Monthly Medical Journal,' vol. vi, p. 541;) but at the last meeting of the British Association, Dr. Houston again brought forward the subject, and completely rebutted Dr. Marshall Hall's arguments (in our opinion at least,) proving that the influence which he imagined to be in operation *could* not have been propagated from one fœtus to the other, consistently with the simplest principles of hydraulics, and with the facts ascertained by anatomical examination. But on this question our readers have now the opportunity of forming their own judgment, by examining Dr. Houston's reply for themselves; it being now published in the 'Dublin Journal of Medical Science' (January, 1844.) It may still be objected that the case, being that of a *monster*, no inferences can rightly be founded upon it in regard to the circulation in perfect animals of the same class. To which we reply, that we should consider it absurd to argue from such a case, that the heart is not generally necessary for the sustenance of the circulation; but that we regard it as satisfactorily proving that there *is* a supplementary power, arising in some way or other out of the passage of blood through the living tissues, and the actions to which it is there subservient; which power may, under the peculiar circumstances of the case, be so increased or exaggerated as to perform the whole, or nearly the whole, of the duty.

We have no wish to be thought to dogmatize on this subject; but when

we remind our readers that the opinions we entertain were strongly urged by Haller, and have been supported in recent times by Professors Alison and Graves, and by many of their most intelligent pupils, we think they will agree with us that they are not to be hastily set aside by experiments such as the foregoing. We may fearlessly ask whether the condition of the dead body, with the syringe and hæmadynamometer fitted to its vessels, was not more *monstrous*,—that is, more aberrant from that normal state it was intended to illustrate,—than the condition of the acardiac fœtus, with living blood circulating through its living vessels, and ministering to its actions of nutrition, secretion, &c.

We should not do justice to Dr. Williams, however, were we not to state, that whilst neglecting what we believe to be one essential element of the morbid conditions in question, he displays peculiar ingenuity in working out the results of physical causes affecting the movement of the blood; and proves that they may produce effects much greater than could have been anticipated. Thus he states that atony of the small vessels is a cause of congestion, not only by making them yield and become distended by the accumulation of blood, but also by rendering them unfit to transmit the force of the current in its proper direction, on account of their tortuosity and want of elasticity; and he illustrates this position by the following experiments, the results of which are very striking:

"To one of Read's enema syringes was adapted a tube with two arms; to one arm was fitted a brass tube two feet long having several right angles in its course; to the other arm was tied a portion of rabbit's intestine, four feet long, and of caliber (when distended with water) double that of the brass tube. The *intestine* was placed in curves and coils, avoiding angles and crossings, which *might obliterate* the canal. The discharging end of both tubes was raised to the same height; that of the intestine being kept open by a short tube of metal. The tubes were then both filled by successive strokes of the piston; and when they both began to discharge, the quantity received from each, in a given number of strokes, was ascertained. Without giving the details, it may be stated that the small metal tube discharged from two to five times the quantity discharged by the larger but membranous tube; the difference being greatest when the strokes of the piston were most forcible and sudden, by which the intestine, although much swelled at its syringe end at each stroke, conveyed comparatively little water. The difference was further increased by raising the discharging ends higher; and when both ends were raised to the height of eight or ten inches, the gut ceased to discharge, each stroke only moving the column of water in it, but this subsiding again, without rising high enough to overflow. On increasing the force of the stroke, the part of the intestine nearest to the syringe burst. The experiment was repeated in various ways, of which I will mention one, with a metal tube two feet eight inches long, and a bore three eighths of an inch, and a portion of dog's intestine of the same length, but when distended, of double the diameter. The metal tube yielded three times more liquid than the intestine." (p. 145.)

We quite agree with Dr. Williams in thinking that, although the experiments exaggerate the difference between healthy and relaxed or congested vessels, yet they really prove that the increased tortuosity and number of vessels in a congested part, the greater mass of their contents, and the atonic flaccidity of their coats, do truly form additional obstacles to the passage of blood through them, although the amount of these obstacles will vary according to the state of the connected circulation.

The loss or neutralization of the propulsive force, by *misdirection*,—in consequence of its being partly expended in distending or dilating the nearer portion, whilst a sufficiency does not remain for the onward propulsion of the blood,—is a principle which seems to us of very high importance, in explaining many anomalies of unequal circulation. But still, we think, there is another influence which contributes to the stagnation of blood in the capillary vessels, and which is frequently its primary cause; we refer to the cessation or diminution of the actions which should take place between the blood and the surrounding tissues, during its passage through the capillary vessels. Of this influence, we consider the condition of asphyxia, in which the actions that ought to take place in the pulmonary capillaries are entirely suspended, as a *glaring instance;* and Dr. Williams does not altogether deny its operation, although he seems to think, that further inquiries will reduce it to physical causes. We regard asphyxia, however, not as an insulated case, but only as one instance, more striking than most others, of the general fact, that depression of the proper function of an organ,—whether that function be nutrition or secretion,—will cause stagnation of blood in its capillaries, or congestion. Even this seems partially admitted by Dr. Williams, as the following passage shows: "Congestion occurs in various organs and surfaces, when their proper secretions are arrested, or suddenly diminished. It is difficult to determine whether the congestion is the cause or the effect of the defective secretion in the first instance; and very probably the relation is mutual: at least this is the most convenient view to take of the matter, for practical purposes. Thus, means which increase the secretion will often remove the congestion; and those which relieve the congestion generally restore the secretion." (p. 297.) We have no doubt that Dr. Williams is right in asserting that such a mutual dependence exists; since experiment shows, on the one hand, that obstruction to the circulation through a part, artificially induced, produces diminution in its natural secretion, whilst often leading to an abnormal discharge or flux; and, on the other hand, the intelligent practitioner is familiar with the fact, that there are forms of congestion which no withdrawal of blood from the part can cure, but which are immediately relieved when the natural secretion is re-established,—just as the congestion of the pulmonary arteries, right side of the heart, and venous system, in asphyxia, is relieved as soon as oxygen can be made to act on the blood in the pulmonary capillaries. We think the distinction a more important one in practice than Dr. Williams seems to regard it; and should be inclined, whenever we fail in detecting any *extraneous* cause for the congestion,—such as obstruction in the lungs, or an imperfectly-acting heart, in a case of congestion of the liver,—to ascribe it to causes having their seat in the part itself, and to treat it accordingly. Doubtless, in almost every case of congestion, a share of the effect will be produced by the *diminished tonicity* of the vessels of the part, in the manner so well illustrated by Dr. Williams; but this we should often regard as rather a *consequence* of the depression of its general vitality, than as its *cause.* Thus it is in states of general debility, that we find gravitation or any other local causes most efficient in producing congestions.

There are many points of great interest in this chapter, which we

should gladly stop to notice, did our limits permit. Dr. Williams is inclined to assign to congestion a larger share in the production of some abnormal conditions, than most pathologists will be ready to admit; but we think he is probably right in so doing. Thus he believes that not only *serous* or *albuminous*, but even *fibrinous* effusions may result from congestion; the former occurring when the blood is poor, so that its watery parts easily pass from the congested vessels, even without much distension; whilst the latter result from the greater richness of the blood, which prevents any transudation, until the tension has much increased, and then causes the effusion of its fibrinous part, as well as of a much larger proportion of albumen. "I have been almost induced," says Dr. Williams, "to suppose that the polypous concretions and pseudo-membranous films occasionally effused on mucous surfaces, may result from long-continued congestion, with a highly fibrinous state of the blood. I have seen these evacuated from the air-tubes in one case, and in another from the intestines, from time to time for months, and even years, without symptoms of inflammation, but under circumstances rendering it probable that congestion was present. Extensive disease of the heart existed in one case, and amenorrhea in the other." (p. 149.) Dr. Williams states that he has been for several years in the habit of referring albuminous urine to congestion of the kidney,—a view, of which Mr. Robinson's experiments have given almost absolute demonstration. The following are the considerations which have led him to this opinion:

"1. The urine often becomes albuminous during great embarrassments of the circulation, in cases of organic disease of the heart, when the kidneys are otherwise healthy. 2. I have, in a few instances, observed temporarily *albuminuria* during the congestive stage of eruptive fevers. 3. In granular *degeneration of* the kidney, the amount of albumen in the urine is augmented by circumstances causing congestion of the kidney, and is reduced by remedies suited to remove this. 4. Bright's disease of the kidney, in its earliest stage, presents the appearance of a highly congested structure, and is excited by causes calculated to produce congestion; such as frequent irritation of the kidneys by stimulating liquors, congestion from exhausted tone, continued exposure to cold, especially after the kidneys have been much excited,—congestion from intropulsion: scarlatina probably operates as the two last combined. 5. The albumen in the urine abounds most in the congestive (first) stage of Bright's disease, the vessels becoming more or less obliterated in the progress of the disease, by a deposit of lymph in the cortical substance, and perhaps especially in the corpora Malpighiana,—which deposit is, at the same time, the cause which perpetuates some degree of congestion, whilst it supersedes the proper secreting structure." (p. 150.)

Dr. Williams speaks of "a variety of *hypertrophy*," as one of the results of continued congestion; but we think the term here misapplied. Hypertrophy consists in an increase of the *natural texture* of the part, which no mere *congestion* can produce; and the deposits which result from this state, if organized at all, are but very imperfectly so, and have no affinity with the surrounding textures, as Dr. Williams well points out in the following passage: "The hypertrophy resulting from congestion is probably not of a uniform kind, comprising equal growth of all the textures; but, arising from an effusion of lymph from the most congested vessels, it is an intervascular deposit,—at first mottling and exaggerating the appearance of the natural structure, as seen in the nutmeg liver and in the early soft stage of granular degeneration of the kidney,

afterwards contracting and compressing the natural structure, and ultimately causing its condensation and atrophy, whilst the new deposit itself forms a granular or nodulated texture of low vitality. Such, I believe, to be the nature and origin of cirrhosis of the liver, and granular degeneration of the kidney." (p. 151.) Such deposits *may* have an indistinct fibrous structure, resembling that of areolar tissue; but this only when there is an unusual degree of plasticity in the blood,—a state bordering on inflammation, and passing into it.

We must pass over the valuable portion of this section, which treats of the remedies for congestion, without comment; but we shall extract the following passage, as affording important practical hints:

"The operation of several of the foregoing agents, in combination or succession, is generally more effectual than that of single ones, in the cure of congestions. Thus, congestion of the liver may resist the action of mercury, and may even be aggravated by it, until the vascular distension has been partially reduced by local bloodletting or derivants; then the mercury, by increasing the secretion, reduces the remaining congestion. Congestion of the kidneys is augmented rather than diminished by diuretics, which then fail to increase the secretion of urine, but may only render it more albuminous. But after some relief has been given by cupping to the loins, and hydragogue purgatives and diaphoretics, then some diuretics, particularly digitalis and cantharides, cause a freer flow of urine, with less albumen." (p. 154.)

In the succeeding section, on Determination of Blood, we meet with views, which appear to us equally imperfect with those on which we have just been commenting in regard to congestion. In our apprehension it is clear that, in a large proportion of cases, increased vital action of the part, whether that action be one of formation or of secretion, is the *cause*, not the consequence, of the increased afflux or determination of blood towards it. This would seem the almost necessary inference from the known effects of stimulants in occasioning such determination; and from the varying effects of the same stimulant on different parts, according to the degree of exalted action which it excites there. On our view of the causes affecting the circulation in the capillaries, an increased rate of motion, and an increased demand for blood, are the necessary consequences of this heightened function; and the enlargement of the arteries that supply the capillary system, so as to permit an increased flow of blood, will be a subsequent change. Dr. Williams, however, thinks differently. After noticing the cases in which determination of blood results from an increase of the *vis a tergo*, he continues, in regard to those more numerous cases in which no such increase exists:

"Is determination of the blood caused by *increased* action of the arteries? The only active property which we know these vessels to possess, is that of slow or tonic *contraction;* and such contraction of arteries leading to a part would diminish instead of increasing the motion and quantity of blood proceeding to the part. We may answer, from direct observation as well as from reasoning, that determination of blood is effected by enlargement of the arteries; and this enlargement is the effect of the arterial distension from behind, acting on a tube which has already lost some of its contractile power. The tonicity of the arteries makes them naturally resist the distending influence of the mass of blood pumped into them by the heart; but if this tonicity be impaired in any part, that of other parts forces the blood in augmented quantity into it, by which it is distended, and becomes an enlarged channel for the transmission of more blood and more force. If the arteries are enlarged, the capillaries and veins leading from them will be also enlarged, and will

share the increase of blood and motion thus supplied to them. We find proof of the enlargement and distension of arteries leading to an inflamed or irritated part, in their increased and harder pulse; the coats of the vessels being stretched to tightness, the pulse is no longer softened by the usual elastic spring. So, too, in the frog's web gently irritated by an aromatic water, we see the arteries become enlarged, supplying a larger and more rapid flow of blood to the capillaries and veins, which all become enlarged also; and the whole vascular plexus, including vessels which before scarcely admitted red particles, then become the channels of a much increased current. This is determination of blood." (p. 157.)

In seeking for a physiological cause of the enlargement of the arteries in determination of blood, Dr. Williams justly observes that all that is known of animal physics opposes the idea of there being any power of "active dilatation" in the arteries; and he, whilst attributing it to a "weakening or reduction of the tone" of the arterial walls, is inclined to think that the nervous system is concerned, occasionally at least, in producing this, *blushing* being a "pregnant instance."

Now we are quite at a loss to know what is the distinction which he draws, between the efficient cause which produces congestion, and that which occasions determination; both conditions being regarded by him as dependent, as our readers will have perceived, on diminished tone, and consequent distension of the vessels of the part by the vis a tergo. How he explains the *diminished* motion in the one case, and the *increased* motion in the latter, we are totally unable to understand. These seem to us the essential elements of the two conditions, depending respectively upon the depression or exaltation of the vital functions of the part. In congestion, there is doubtless a diminished tonicity of the arteries; which, as we have seen, will increase the obstruction which may have begun in the capillaries, and will thus render the stagnation more complete, and the vascular tension greater. In determination of blood, on the other hand, there seems to us no evidence whatever, that the vital properties of the arteries are depressed; and from the causes which produce this state, no such effect could be anticipated. For all these causes are of such a nature, as to stimulate (for a time at least) the natural actions of a part; as may be seen in the determination of blood to the ovaries, uterus, and mammæ, at the periods of their functional excitement; or in the increased afflux of nutrient fluid to any set of muscles whose action has been peculiarly vigorous. We cannot but think that the *vis a fronte* thus generated is the truer explanation of the increased distension of the arteries leading to the part; but we would not shut out the influence of the nervous system, which may *permit* that distension in the manner suggested by Dr. Williams. This, indeed, was long ago suggested by ourselves. (Vol. VIII.) When the determination is long-continued, however, as is normally the case in regard to the uterus and mammæ during pregnancy and lactation, the arteries become enlarged by increased nutrition of their walls; a circumstance which strikingly distinguishes their state in a determination, from their condition in congestion. But there cannot be a more manifest proof of the opposite vital condition of the part itself, in these two states, than is afforded by its difference of functional condition. For whilst in congestion we have depressed function and deficient plastic action in the part—so that the plastic matter of the blood, not being drawn off by the normal process of nutrition, is effused in an unorganized or imperfectly organized form—there is, in determination of blood, exalted

function of the part, accompanied by increased nutrition or true hypertrophy, if the determination should continue long enough, or should frequently recur. There is an exception, however, in regard to determination to the *head*, which may produce the opposite symptoms of excitement or depression; but this exception is explained by Dr. Williams, in accordance with the peculiar conditions of the cerebral circulation. He has noticed that "fits of epilepsy and convulsive hysteria are immediately preceded by throbbing of the carotids, which shows that the determination of blood is the proximate cause of the paroxysm. Drs. Darwin and Parry relate cases in which convulsive fits were prevented by pressure on one of the carotids; and I have practised this expedient with success in several cases. Many of the epileptic patients whom I have questioned have stated that the fit is always preceded by palpitation; which, for reasons before explained, sometimes peculiarly determines blood to the head." (p. 155.) The efficiency of a partial interruption of the current of blood going to the part, in lowering its action, is perfectly consistent with our view, that the origin of this state of exalted function is in the part itself; for if the *pabulum* to its operations be not supplied in sufficient quantity, these actions must necessarily be lowered.

We have now discharged our consciences, as to the critical examination of a part of Dr. Williams's most valuable treatise, in which it appears to us that he has been led astray, by his manifest indisposition to admit any other cause than the heart's action, as the moving force in the capillary circulation. We are far from wishing to assert dogmatically that he is wrong and that we are right; but we do feel that our doctrine, besides being the result of a more extended induction of physiological facts, enables us to give a more consistent view of the pathological phenomena of congestion and determination, than we find developed in his account of these subjects; and we shall elsewhere endeavour to show, that it more fully explains the complex phenomena of inflammation also.

The more pleasing task now remains, of briefly noticing the remaining portion of the work; which we are compelled, from the extent our review has already reached, to pass over with little but an enumeration of the topics it embraces, and a general indication of the manner in which these are treated.

The chapter which follows the discussion of inflammation and its results, treats of the Structural Diseases, or Diseases of Nutrition; which are the consequences of the various abnormal states of the blood, and of the solid textures, which have been previously considered. We think that Dr. Williams has done wisely in devoting a separate division of his treatise to this subject, although many portions of it might be considered to belong to the heads already passed over; for structural disease cannot, as he justly remarks, be always strictly distinguished into ultimate and proximate elements; and although we might infer from analogy that the several textures are singly affected in structural disease, yet we find the morbid alteration rarely confined to one anatomical element, but rather affecting an organ or part as a whole. It is not the object of Dr. Williams's treatise to give details of structural disease, which belong rather to the department of morbid anatomy; but he aims at tracing the chief forms of alteration in the nutritive processes, in which these diseases originate. It must be confessed that our knowledge on these subjects is as

yet very limited; but Dr. Williams has made the most of what we possess; and we know no other account of these conditions which can be compared with his, either in richness of detail, (wherever the materials were within his reach,) philosophical treatment of general principles, or *suggestiveness* of character. The following table, exhibiting the classification which he adopts, will afford an outline view of his mode of treating the subject:

ELEMENTS OF STRUCTURAL DISEASE.

- *Diseased Nutrition*
  - Increased = Hypertrophy.
  - Diminished = Atrophy.
  - Perverted .
    - Induration.
    - Softening.
    - Transformation.
    - Deposits
      - Euplastic
        - Cicatrices.
        - False membranes.
      - Cacoplastic
        - Cirrhosis.
        - Fibro-cartilage.
        - Gray tubercle.
        - Atheroma, &c.
      - Aplastic
        - Yellow tubercle.
        - Calcareous matter, &c.
    - Growths
      - Non-malignant.
        - Cysts.
        - Tumours.
        - Hydatids, &c.
      - Malignant
        - Carcinoma.
        - Encephaloma.
        - Melanosis, &c.
- *Altered Mechanism*
  - Contraction.
  - Dilatation.
  - Obstruction.
  - Compression.
  - Displacement.
  - Rupture, &c.

If there is one part more than another which we would recommend to the special consideration of our readers, it is that which treats of Tubercle, and its connexion with constitutional states. We believe that Dr. Williams may justly take credit to himself for being the first promulgator of the doctrine, that tubercle is nearly related to the ordinary fibrinous and albuminous constituents of the blood, being a degenerated or cacoplastic form of the plasma, which ought to be the pabulum for the supply of the several tissues and organs; and that the tendency to its deposition should be considered, therefore, as a *diathesis*, to be treated by constitutional remedies, especially those which improve the processes of nutrition and assimilation. The caco-plastic nature of tubercle has been abundantly proved by the recent microscopic observations of Gerber, Addison, Gulliver, and others; which have shown that it may present various gradations of organization, from a texture consisting of imperfectly formed fibres and cells, to one which exhibits scarcely a trace of definite structure. There is a corresponding variety in the results of their deposition; the less degraded or degenerating forms of tubercle having a tendency to contract, and to produce atrophy of the organ; whilst the more degraded or aplastic pass on to the stage of softening and disintegration.

The concluding chapters embrace Nosology, Semeiology and Diagnosis, Prognosis, and Prophylaxis or Hygienics. The author avoids, and, we think, with wisdom, entering into any detail on the subject of nosology; but contents himself with indicating the principles, on which definitions

and classifications of disease should be founded. The next subject, semeiology, is more fully and systematically treated. The indications of diseased action are divided by Dr. Williams into *physical signs* and *vital symptoms*, on the principles specified in the following extracts:

"*Physical signs* are those physical properties of the body, or of a part of it, which are perceptible to any of the senses of the observer. Thus, the form, size, colour, firmness or softness, weight, heat, and odour of the whole body, may be said to give physical signs or evidence of its condition, whether in health or in disease. So also, the form, size, colour, resistance, position, temperature, smell, and acoustic properties of a part of the body, afford physical signs of its condition, whether in health or disease. Thus the appearance of an external disease, the feeling of a solid tumour or of the fluctuation of liquid in the abdomen, listening to sounds produced by or in diseased internal parts, furnish us with physical signs of the presence of disease." (p. 356.)

"*Vital symptoms* are those phenomena which depend on *vital* properties of a part or parts of the body. Thus, irritability, tonicity, sensibility, excito-motion, secretion, and the more complex functions resulting from combinations of these elementary vital properties in a natural state, produce the symptoms of health; in an altered state, constitute the symptoms of disease. Hence vital symptoms have also been called *functional* symptoms, and *physiological;* but both these terms are objectionable, because both *function* and *physiology* relate likewise to physical properties, and would, therefore, include physical signs." (p. 359.)

Now we much doubt whether it is possible to make any division of the phenomena presented by disease, that shall be at the same time philosophical in character, and practically useful; and we cannot think that Dr. Williams has succeeded better than his predecessors. In fact, it seems to us that his usual acuteness has somewhat failed him in the analysis of this difficult subject. For do not the *physical signs* of disease depend, equally with the *vital symptoms*, "upon the vital properties of a part or parts of the body?" Does not an offensive odour, for example, result from some act of decomposition, occasioned by a disorder of the nutrient function? and is not the fluctuation of an abscess, and the resistance of a tumour, equally dependent upon morbid vital processes, with the pain which the patient experiences? Or, on the other hand, is not the disordered *motion* of a part—as, for example, the unequal elevation of the ribs on the two sides, or any form of convulsive action—as much a *physical* sign as its form, size, or colour? The least exceptionable mode of classifying morbid phenomena, as it appears to us, is that which regards the *signs* as comprehending *all* those of which the senses of the observer can inform him; and the *symptoms* as including those, for his information in regard to which he is necessarily dependent upon the statements of the patient. This division is of considerable practical utility in cases where we have reason to suspect a wilful or undesigned perversion of the truth, as in feigned disease or hysteria; but, in general, we doubt whether *any* classification can supersede the necessity of careful and discriminating analysis in each individual case. Notwithstanding our difference of opinion from Dr. Williams on the foregoing points, we strongly recommend this chapter to the perusal of our readers; as they will find in it many valuable hints, derived from extensive practical experience, as well as from sagacious reasoning.

The subject of diagnosis is passed over very cursorily; we could wish that it had been treated in a manner more conformable to its importance. The following general remarks are most true and valuable:

"Thus every department of medical knowledge is brought to bear on diagnosis; and in no branch is the information as well as the judgment of the practitioner more brought to a test. Natural shrewdness and tact, with some general knowledge of the nature and treatment of disease, may sometimes enable a comparatively ignorant person to practise medicine with an appearance of success; but such a person can make no hand of diagnosis; and he wisely either evades the whole subject, or expresses his opinion in vague terms, and scrupulously avoids their being brought to the test of the scalpel. The well-informed practitioner, on the other hand, feels that this is the subject which requires the full application of his mental powers and knowledge, as well as the keen exercise of his powers of observation; and in proportion as his senses are practised in observing, his information well arranged in relation to what he observes, and his judgment matured in discriminating and deciding the results, so will he be successful in forming his diagnosis, and in applying it to prognosis and practice." (p. 367.)

The chapter closes with this judicious and practical observation:

"The object of a complete investigation of the state of the patient is not merely to determine the particular disease under which the patient labours, but to discover what is healthy as well as what is morbid in his condition. The prognosis, or estimation of the amount and event of the disease, and the application of treatment, requires this full investigation. We have to consider, not merely *disease in the body*, but *the body in disease;* and it is by losing sight of this great practical axiom, that minute or microscopic inquirers, who may be singularly successful in special diagnosis, signally fail in prognosis and in practice." (p. 368.)

The subject of Prognosis is treated in the most general manner; and might, we think, have been more dwelt on with advantage; since there is nothing which the young practitioner requires, in reference to this subject, so much as *principles*, by the judicious application of which alone can he manifest any superiority to the empirical predictions made by ignorant persons who have been long habituated to the observation of disease. From this topic, Dr. Williams passes on to the consideration of the different *modes of death;* which naturally follows the inquiry into the relative importance of different symptoms. They are thus classified by him:

Death (cessation of function) beginning at the heart	Sudden = Syncope. Gradual = Asthenia.
„ beginning at the breathing apparatus	= Asphyxia, or apnea.
„ beginning at the brain .	= Coma.
„ beginning at the medulla .	= Paralysis.
„ beginning in the blood .	= Necremia, (νεκρος, dead; αιμα, blood.)

Dr. Williams thinks it better to distinguish the mode of death by asphyxia, in which the *first* obstruction is in the breathing apparatus, from that which results from coma or paralysis; although the *immediate* cause of death is the same in both instances, viz. stagnation of blood in the pulmonary capillaries, and consequent interruption of the circulation. For practical purposes, this is certainly desirable; but we should have thought that the classification should have stood thus:

Death from interruption to the pulmonary circulation	beginning in the breathing apparatus = Apnea. beginning in the nervous centres = Coma and paralysis.

We do not see that any distinction ought to be drawn between death beginning at the brain (coma), and death beginning at the medulla (paralysis); for coma need not prove fatal, unless the medulla oblongata be affected, in such a manner as to induce partial or complete suspension of the respiratory movements. This is clearly proved by the occasional

persistence of hysteric coma—in which there is a complete suspension of the cerebral functions, without any affection of the medulla,—for days and even weeks, without the slightest tendency to asphyxia; and by the results of Flourens' experiments on the complete ablation of the cerebral hemispheres. Dr. Williams further points out the influence which the destruction of a considerable part of the spinal cord will possess on the functions less immediately connected with the maintenance of life, so as at last to cause the death of the whole system, by the suspension or alteration of a large number of its less important acts of nutrition, secretion, &c.: and he suggests the interesting inquiry, whether the gangrene of the lower extremities, sometimes induced by the use of ergotted corn, has not a connexion with injured function of the spinal cord. The following is his account of *Necremia:*

"Necremia, or death beginning with the blood, are terms which I venture to give to those fatal cases, in which the first and most remarkable change is exhibited by the blood. In typhoid fevers and others of the malignant or pestilential kind, none of the solids of the body constantly exhibit such an early change of function or structure, as would warrant us in tracing disease or death to them. It is true, that the functions of many solids are impaired,—the muscular and nervous systems, secretion, digestion, assimilation, and nutrition, all suffer; but the very universality of the affection seems itself to point to some cause more general than can be found in any individual function; and such a cause may be found in the blood. The blood, at an early period of these diseases, when they occur in their worst form, exhibits changes which show that disorder begins with it, and this disorder may reach to a fatal degree. The appearance of petechiæ and vibices on the external surface, the occurrence of more extensive hemorrhages in internal parts, the general fluidity of the blood, and frequently its unusually dark or otherwise altered aspect, its poisonous properties as exhibited in its deleterious operation on other animals, and its proneness to pass into decomposition, point out the blood as the first seat of the disorder, and by the failure of its natural properties and offices as the vivifier of all structure and function, it is plainly the medium by which death begins in the body. How far the change in the blood is in its structure and vital properties, or in its chemical composition, further research alone can determine; the vivifying function of the blood depends on all these combined, and it is this function which obviously fails. Hence the complete adynamia, or general prostration of all the living powers, which occurs where this source of death is most powerful. The blood, the natural source of life to the whole body, is itself dead, and spreads death instead of life. Almost simultaneously, the heart loses its power, the pulse becoming very weak, frequent, and unsteady; the vessels lose their tone, especially the capillaries of the most vascular organs, and congestions occur to a great amount; the brain becomes inactive, and stupor ensues; the medulla is torpid, and the powers of respiration and excretion are imperfect; voluntary motion is almost suspended; secretions fail; molecular nutrition ceases; and at a rate much more early than in other modes of death, *molecular* death following close on *somatic* death—that is, structures die and begin to run into decomposition, as soon as the pulse and breath have ceased; nay, a partial change of this kind may even precede the death of the whole body." (p. 386.)

We quite agree with Dr. Williams in this view of the subject, which we had ourselves been previously led to entertain by similar considerations; and we should be glad to follow him through his application of the principle here laid down to the pathology and treatment of the various endemic, epidemic, and infectious diseases, in which it operates to a greater or less extent. But this our limits forbid; and we shall refer our readers to the work itself, for this as for many other excellent examples of the connexion by sagacious reasoning—both inductive and deductive—

between sound principles on the one hand, and valuable practical observations on the other.

In another article in our present Number (art. IV, p. 344) will be found a series of facts, which tend to establish another mode of death, occurring in diseases of exhaustion, namely, general reduction of the temperature of the body, consequent upon exhaustion of its calorifying materials. It is well known that all the vital actions in the warm-blooded animals require, as one of their conditions, the maintenance of a temperature above the usual average of that of the atmosphere; and it necessarily follows, that if the heat of the entire body be permanently depressed, they must come to an end; and this, not in any one part alone, causing a cessation of a particular function, but in all the organs at the same time, giving a simultaneous check to their actions. We should be ourselves inclined, in considering the modes of death, to regard necremia and loss of heat as the two *most general* forms of dissolution; because they operate on the whole system alike and *simultaneously;* and then to consider the forms in which a single organ is primarily affected, as in syncope, and asphyxia, producing somatic death, on account of the general cessation of function, which *follows* the suspension of its own actions.

We are disappointed at finding under the last head Prophylaxis and Hygienics, nothing but an apology from the author, for being prevented, by want of time, from treating these subjects as he had intended. We hope, for the sake of the student and young practitioner, that this deficiency will be remedied hereafter; since we are convinced that there is no department of medicine which has been so much neglected, both in theory and practice; and to the increased cultivation of which we are to look for so much improvement in the application of science to the general welfare. One other deficiency we would indicate as capable, in our opinion, of being advantageously supplied in this treatise. It may be said that the subject of general therapeutics is introduced and discussed in almost every portion of the volume; but we should like to see the *principles* which should guide the administration of medicines, and which govern their action on the economy, brought together in as complete a form as the present state of our knowledge on the subject admits, even though the doing so might involve some repetition. We cannot think that, even with these additions, the work need be extended so much beyond its present very moderate limits, as to prevent it from becoming the text-book of every intelligent student and young practitioner. It is not to these alone, however, that we would recommend it; but to *all* who do not consider themselves too old to learn,—who, remembering the *ars longa, vita brevis,* are unwilling to regard their education as being completed in the years of their pupillage, but desire to avail themselves of the results of the extended inquiries now going on in the various departments of pathology, combined and generalized by an experienced teacher and skilful practitioner,—and who look for honorable distinction, either by their skill in the treatment of disease, or by the advances they may themselves make towards a further knowledge of its mysteries. To all such, then, we strongly recommend the perusal of Dr. Williams's 'Principles of Medicine;' in the confidence that, whether or not they see *all* the merit in it which we have stated it to possess, they cannot peruse it attentively and engraft its contents on their own minds without benefit to themselves, and consequently to their patients.

Art. XIII.

A Dictionary of Practical Medicine, comprising General Pathology, the Nature and Treatment of Diseases, &c. &c. By James Copland, M.D. F.R.S., &c. Three Vols. Vols. I, II.—*London*, 1844. 8vo, pp. 1056, 931.

It affords us sincere pleasure to be able to announce to our readers, that the great work, whose title we have just transcribed, has at length arrived at such a stage of its progress, and attained such a form, as to claim a more formal notice from us than we have hitherto given it. Two thirds of the gigantic task undertaken by Dr. Copland are completed, and the first two volumes now stand before us in their own portly size, and fitly apparelled for the bookcase. We are given to unstand that the materials of the remaining volume are in an advanced state of preparation, and that the future parts will appear at shorter intervals than those of the last volume. We trust this may be the case, as the slow and uncertain progress of the work heretofore, has been a cause of great disappointment to the subscribers. It is no satisfactory reply to their discontent, that the magnitude of the labour fully justifies the delay that has taken place, because a positive promise of a much earlier completion was given by the publishers at the time of subscription. If we were to admit the plea of amount of work and difficulty of execution, as justification of slow performance, we could not conscientiously find fault with the author, although his task should not be completed for years; but this amount and this difficulty ought to have been better calculated before the promise was made.

The thing, however, that more immediately concerns us is, that here we have before us two huge volumes out of the three of which the Dictionary is to consist; and when we record this "great fact," we feel it equally a great duty to record our opinion—that, as there is no medical practitioner in this country, old or young, high or low, who will not derive great pleasure and great profit by consulting them, so we think there is no one who should not add them to his library. The information amassed in these volumes is literally enormous, and contemplated simply as an accumulation, it must excite astonishment as the production of an individual; but when it is further considered, that the whole of the materials have been most carefully selected from all existing sources, most patiently studied, valued, winnowed, digested, elaborated, and arranged into compact and simple forms, easily accessible and readily available in practice, it is not easy to point out, in the whole of medical literature, any work by a single hand so much calculated to excite admiration of the industry and talents of the author. In every article contained in the volumes, the reader cannot fail to be struck with the writer's most extensive learning, which has enabled him to collect knowledge from all authorities, ancient and modern, foreign and domestic; and he will, at the same time, be no less surprised than gratified at the singular power which has arranged the whole so lucidly and in such systematic order.

The first volume comprehends the subjects from Abdomen to Furuncle. It contains about 120 articles, and, among others, elaborate treatises on Diseases of the *Blood*, the *Brain*, the *Bronchi*, the *Digestive Canal*; on *Disease in general*, *Dysentery*, *Diseases of the Eye*, and *Fever* in all its forms. The second volume extends from Gall-bladder to Ozæna, and

contains about 100 articles. Among these we find treated at great length the subjects of *Hemorrhage, Diseases of the Heart, Hysterical affections, Infection, Inflammation, Insanity,* Diseases of the *Intestines,* of the *Kidneys,* of the *Larynx and Trachea,* of the *Liver,* of the *Lungs,* &c. Of any single article in the volume, and indeed in the whole work, we think that on Insanity is the largest; it occupies no fewer than 272 columns, or 136 pages, equal to a large octavo volume of ordinary-sized print. We feel bound in justice to add that this article gives so complete a view of the whole subject of insanity in all its aspects, treats so largely of its history, pathology, and management, that it constitutes, in our opinion, the completest treatise on the disease with which we are acquainted.

In comparing the 'Dictionary of Practical Medicine' with its numerous rivals, the work of a large body of contributors, we have always been surprised, and we are more so now than ever, that one man should be able to cope with so many. And looking at the one near us, and which may be regarded as perhaps the best of its class, the *Dictionnaire de Médecine Pratique,* we are naturally reminded of the complimentary couplet addressed to Samuel Johnson on the completion of *his* Dictionary, and which, *mutato nomine,* may, with at least equal propriety, be applied to our author;

> And *Copland* well armed like a hero of yore,
> Has beat forty Frenchmen and will beat forty more.

Art. XIV.

Medicinisches Schriftsteller-Lexicon der jetz lebenden Aertzte, Wundärtzte, Geburtshelfer, Apotheker und Naturforscher aller gebildeter Völker. Von Adolph Carl Peter Callisen, *Doctor* der Medicin und Chirurgie, Professor an der Königl. chirurgischen Academie zu Copenhagen, &c.—*Copenhagen,* 1830-42. Band i—xxx.

Lexicon of Living Medical Authors, Physicians, Surgeons, Man-midwives, Apothecaries, and Natural Historians of all civilized nations. By A. C. P. Callisen, m.d.—*Copenhagen,* 1803-42. Thirty Volumes.

The above work is one of the most remarkable ever undertaken or executed by an individual. In point of labour and research, it may be compared to that of Dr. Copland, just noticed, although it emulates it in no other respect. The *Lexicon* is a mere bibliography; but it is a bibliography of a very peculiar kind, and must ever remain a monument of the astonishing industry and perseverance of the author.

As its title implies, it is devoted exclusively to the writings of contemporary medical authors, and is arranged in alphabetical order, according to the writers' names. In addition to the authors' works, it gives also, in all practical cases, a brief note of the place and time of their birth, of the place and date of their graduation, of the offices they hold, or have held, and of their actual residence, and social position. It gives the titles of the works in full, in the language in which they are composed; the date of publication, the number of editions, and the date of each, the form, size, number of pages, and frequently the price; the translations (if any) into foreign languages; and lastly, the volume and page of the journals in which the individual work has been reviewed. Another very marked feature in the Lexicon is, that in addition to the notice of distinct works published separately by any author, it gives the title of every paper printed by him in any periodical work, as

well as a reference to the German journals in which such paper has been translated or noticed!

The first portion of the work, comprehending the complete alphabet of authors, closes with the twenty-first volume, published in the year 1835, only five years from the commencement of the publication. Volumes xxii and part of xxiii, contain the anonymous works that have appeared since the year 1780; and then follows the catalogue of all the journals, transactions of societies, and collections of the works of individual authors since the same date. This portion of the work occupies nearly three volumes, terminating with the twenty-fifth. The exposition of the contents of these numerous works is very minute and complete. Last of all comes the *Nachtrag* or appendix, containing emendations of, and additions to the articles in the preceding parts, a catalogue of the more recent periodical literature, and accounts of the writings of authors who have died since 1830, the date of the commencement of the undertaking. This last portion of the work is still incomplete, the last volume which has reached us, the thirtieth, containing only the letter M. It appeared at Copenhagen in 1842.

The magnitude of this work, and the astonishing labour expended in its composition, must appear sufficiently evident from the above account of it. It is stated in the preface to the twenty-fifth volume, that the first twenty-one volumes contain the names of 28,061 authors, and the titles of 68,404 works or papers written by them, without reckoning the innumerable references to new editions, extracts, reviews, &c., under each work. In the twenty-second and twenty-third volumes, there are noticed 3,783 anonymous works published since 1780; and in the twenty-fourth and twenty-fifth, 2,240 collections of authors' works, transactions of societies and journals. The contents of the appendix, which will probably extend to seven or eight volumes, will swell this list not a little.

Although we think the plan of Professor Callisen's work defective in some respects, we consider it invaluable as a mine of modern medical bibliography. In point of completeness it has no rival in any modern production; and its accuracy, as far as we are able to judge, is, all things considered, extraordinary. When it is completed with its various indexes of classified contents, &c., it will be indispensable in every medical library. It is a curious fact that an English or French physician or surgeon, desirous of obtaining a complete list of the medical writings of one of his countrymen, that have appeared during the last sixty years, has no other sure resource but to go to a work written and published in Copenhagen.

We cannot conclude this brief notice of so great a work, without offering to its most industrious and public-spirited author, the expression of our respect and gratitude. We have reason to believe that in a mercantile point of view, the Lexicon has not been merely unprofitable but the occasion of great pecuniary loss to Professor Callisen; and nothing but the noblest and purest principles of action could have led him to persevere, during so many years, in bringing it to a conclusion. We think he has thus fairly established a claim on the support of the medical profession of all countries; and it will give us much gratification if the present imperfect notice of his labours should induce the more wealthy of our brethren, and the public medical libraries, to add the Schriftsteller-Lexicon to their stock of books.

Art. XV.

A Practical Treatise on Organic Diseases of the Uterus. By John C. W. Lever, m.d., Assistant Accoucheur at Guy's Hospital, &c. &c. —*London*, 1843. 8vo, pp. 240.

Dr. Lever's treatise is the substance of an essay on 'the Symptoms and Treatment of Organic Diseases of the Uterus,' to which was awarded the Fothergillian gold medal, by the council of the Medical Society of London, in 1843, and one of the reasons he assigns for its publication is, "that it has been the custom for some years past to submit to the public that Thesis which has been honoured with the Fothergillian Medal." The work is written in a very clear and unpretending style; and from the opportunities which our author possesses for the investigation of uterine diseases, (having from one to two hundred cases weekly under his inspection,) he must be well qualified to write upon the subjects of which it treats.

The volume is divided into three Parts. The First comprises inflammation of the uterus, acute and chronic, with their sequelæ; the Second, the specific diseases, under which term, he includes polypus, hard, fleshy or fibrous tumours and strumous tubercles, &c.; and the Third, the malignant diseases, as cauliflower excrescence, corroding ulcer of the uterus, melanosis and the varieties of cancer. The author commences his work with some statistical observations on functional and organic diseases of the uterus, the results of which show that functional disease is more frequent than organic in the proportion of 65·2 per cent. to 34·5 *per cent.* It results also that marriage favours the development of *organic changes* in the uterus: "of 95 females affected with polypus, carcinoma, fungoid disease, and hard tumours, 89 were married, and 6 were single." This is not to be wondered at, he says "considering the part the uterus has to perform, its turgescence during copulation, its increase of structure and development during pregnancy, and the accidents to which it is liable, (especially the mouth and neck,) during the process of parturition." (p. 5.) It appears that the diathesis accompanying organic disease does not impair the faculty of conception, since out of 89 married women, affected with various organic uterine diseases, 8 had never conceived, the child-bearing women amounting to 91·09 per cent. Dr. Lever also states that organic disease of the uterus does not materially affect the life of the child, and that when death does occur it appears to depend on the protraction of the labour from the non-dilatibility of the parts, and the consequent pressure upon the head; "81 women conceived 553 times, 43 conceptions, or 7·7 per cent., terminated in abortion, and 510 children, or 92·3 per cent., were born at the full period of utero-gestation. Of these 510 children, 12 only, or 2·35 per cent., were still-born." (p. 6.)

We pass over the general symptoms of organic disease of the uterus, and come to the first part of the work, in which Dr. Lever treats of inflammation of the uterus. This he divides into the acute and chronic, and treats of it as it occurs, 1, in the unimpregnated, and 2, in the impregnated uterus.

Acute inflammation of the unimpregnated uterus is not of frequent occurrence. It rarely shows itself before puberty, although Dr. Lever

quotes a case from Dance, in which it was fully developed in a child eight years of age. It mostly arises from suppressed menstruation, or the use of strong injections for the cure of leucorrhea. We have seen a case produced by the irritation of menstruation. This form of the disease is rarely fatal, but Dr. Lever has seen three such cases. It most frequently terminates in resolution, sometimes it becomes chronic. Ramollissement is an occasional result of this disease, as well as abscess and gangrene, of which latter termination Dr. Lever does not speak from experience.

Acute inflammation of the uterus during pregnancy and after labour is next treated of, the latter being by far the most frequent during pregnancy. The inflammation may attack any part of the uterus, but most frequently that portion where the placenta is attached, producing adhesion of that body to the uterus. It may occur in the cervix of the uterus leading to ramollissement of the part. It is occasioned most commonly by cold, by mechanical injuries, as a fall, blow or attempts to induce premature labour by mechanical means, or the exhibition of medicines, especially ergot of rye. Inflammation occurring after labour may be caused by the injection of cold water or styptics, to allay hemorrhage, by violence when performing the operation of version or the unskilful use of instruments; we have seen it frequently arise without any assignable cause. Inflammation of the uterus during pregnancy may terminate in resolution, adhesion of the placenta to the uterus, occasionally in ramollisement, of which termination Dr. Lever relates a case which terminated fatally from laceration of the softened tissues. The substance of the case is as follows. H. A., a stout plethoric woman, twenty-five years of age, who had borne three dead children, was taken in labour with her fourth child on February 22, at half-past eight o'clock in the morning. Her medical attendant was sent for, and found the os uteri dilating. At half-past ten o'clock the os uteri was fully dilated, and the head presented in the second position. The pains were powerful and expulsive, but the head did not descend, and at half-past one o'clock Dr. Lever was sent for, but before he arrived symptoms of rupture of the uterus showed themselves. The woman complained of an unusual soreness of her right side; the pains ceased; vomiting with difficulty of breathing supervened, and there was great depression of the pulse. Dr. Lever immediately on his arrival delivered the woman by lessening the child's head, and the placenta immediately followed. She lived through the following day, but died early next morning. On making a post-mortem examination, a slit was discovered in the cervix uteri at the posterior and right side, forming a communication between the peritoneal sac and the vagina, about two inches in length; at this situation the uterine tissue was soft and easily lacerable.

Inflammation of the impregnated uterus may terminate in abscess and gangrene, which latter is very rare. Dr. Lever relates an interesting case of abscess of the uterus in a lady six months pregnant, which opened into the vagina. From an imprudent ride in a carriage, premature labour came on, and she expelled a dead child in a state of decomposition. Her convalescence was rapid, and in twelve months after, she gave birth to a second child without any untoward circumstances.

In the *treatment* of inflammation of the impregnated uterus, our author

recommends local bleeding, general bleeding being seldom necessary. The system should be brought quickly under the influence of mercury and its action kept up for some time. Hip-baths and anodyne enemata are serviceable. After the acute symptoms have passed away, Dr. Lever recommends blisters, but prefers a repetition of them to the keeping one open. In the treatment of inflammation of the uterus after delivery, he bleeds locally and generally, according to the constitution of the patient, but is decidedly adverse to the administration of mercury. He says "so far as my experience has gone, mercury seldom appears to exercise any salutary influence over this disease; when it has been administered so as to affect the system rapidly, it seems to hasten the patient's dissolution, provoking diarrhea, &c., and I have long since omitted its employment." (p. 39.) He usually depends on general and local bleeding, anodyne fomentations, and the exhibition of diaphoretics, especially Dover's powder. He says "we not unfrequently find that women who have suffered from hysteritis do not again become pregnant. This will in most cases arise from closure of the Fallopian tubes, preventing the admission of the semen to the ovaries." (p. 39.)

Chronic inflammation of the uterus is usually a sequel of the acute form, but not always. Dr. Lever observes, that the improper use of the secale cornutum may give rise to this kind of inflammation, and that those who have suffered from this cause are not prone to reconceive, and also that "not unfrequently the pathological changes produced in the uterine tissues serve as a nidus for the deposition and subsequent development of malignant disease." (p. 44.)

Chronic inflammation may affect the whole organ, or be confined to the os and cervix of the uterus. The sequelæ of chronic inflammation are hypertrophy, engorgement, induration, simple ulceration and enlargement of the glands of the os and cervix uteri. These, with their treatment, are well detailed. We do not, however, quite like our author's definition of engorgement of the uterus, neither do we think it quite correct. He says, by "engorgement," I mean a varicose distended condition of the uterine vessels. The uterus when visually examined has a livid appearance." (p. 59.) A varicose condition of the vessels implies a morbid state of their coats. Does Dr. Lever mean to imply this? A varicose state of the vessels in other parts of the body is a very intractable disease, and yet the cases brought forward by our author to illustrate this form of the disease, were cured in a very short time, one in five weeks and the second in a month. We refer the reader to the cases themselves, which we should rather consider as examples of congestion of the uterus, in which the inflammatory symptoms had not perfectly subsided.

The specific diseases of the uterus include polypus, fibrous tumours, tubercles of the uterus connected with a strumous diathesis, syphilis and gonorrhœa uteri.

Polypus. Our author defines polypus uteri to be "a tumour generally round or oval attached to some part of the uterus by a neck or pedicle of smaller size than the body." (p. 80.) Polypi vary in size from a pea to a child's head; they are usually round or oval, but sometimes present the form of a gherkin. When seen by means of the speculum, their colour is found to vary: in some instances they are white, in others red, and occasionally livid and blue veins are sometimes observed traversing

their surface. Dr. Lever divides polypi into three varieties: the fibrous, the cellular, (which is very rare,) and the glandular. These last are supposed to be morbid enlargements of the ovula nabothi.

Uterine polypi are most frequently developed in the cellular tissue connecting the muscular and mucous coat, but occasionally are found arising from the muscular coat itself, and derive an external covering from the mucous membrane of the uterus. Polypi may grow from any part of the uterus, from the fundus, body, cervix or os uteri; and it is of importance in a practical point of view to determine the seat of attachment. Persons of sedentary habits, and who reside in damp and unhealthy situations, and those of a lymphatic temperament, are more liable to polypi. According to Dr. Lever, he has found polypi more frequent in the unmarried than the married, in the ratio of 7 to 3.

One of the most prominent symptoms which attend this disease, is hemorrhage, which is not unfrequently mistaken for the menstrual secretion. Hemorrhages of this kind are irregular in their appearance, and also as to the quantity of blood discharged. As the disease advances, the discharge usually increases also. The discharge of blood does not appear to depend upon the size of the polypus, for we frequently find that with a small polypus as much blood is lost, (if not more,) as when the polypus is large. The menstrual periods are usually prolonged. In the intervals of the hemorrhage, there is usually more or less of other discharges; in some instances it is mucous (leucorrhea), in others it is of a watery nature, ill coloured and fetid. The patient complains of central pains with weight in the pelvis and bearing-down, tenesmus and difficulty in micturition. The frequent losses of blood produce an anemic condition of the constitution. There are vomitings, palpitation, œdema, and emaciation. According to Dr. Lever, uterine polypi are found as frequently sensible as insensible.

The diagnosis of polypus is extremely important, and to this accordingly our author devotes particular attention. It is liable to be mistaken for early pregnancy, prolapsus uteri, inversion of the uterus; scirrhous enlargement of the os uteri; the "vivaces" of Levret; cauliflower excrescence; fungoid polypoid growths of cancer; an elytrocele, and lastly, encysted tumours of the vagina, and tumours between the vagina and rectum. The most important accident which polypus is liable to be mistaken for is inversion of the uterus: "the history of the case, (our author says,) its origin at the time of delivery, together with the state of the vagina itself, the presence of the os uteri, &c., will assist us in forming our diagnosis," (p. 88,) and he might have added, an examination by the finger "per rectum," will discover the absence of the uterus. "In those cases where the inversion is of a chronic character, more difficulty is experienced in forming our opinion. Careful examination made by the finger or catheter will discover that the inverted uterus is encircled at its neck with a cul-de-sac of little or no depth; while in polypus the instrument may be carried some distance along its pedicle beyond the os uteri, through which it had passed." (p. 88.) These observations only apply to partial inversion of the uterus; when it is complete, the os uteri does not embrace the inverted uterus, but may be felt as a ring behind the cul-de-sac, formed by the vaginal membrane. Chronic inversion of the uterus may also be distinguished from polypus by bearing in mind, that

the inverted uterus is large at first, but in process of time becomes smaller, whilst polypus, on the contrary, increases in size, and continues to increase so long as it is allowed to remain. "There is more pain and tenderness in the inverted womb than in polypus, which in some cases is but little sensible when stretched or pricked, although acutely sensible in others." (p. 88.)

With respect to the *treatment*, our author mentions four methods for the removal of polypi, viz., torsion, the ligature, excision, and the actual cautery. The operation by torsion is easily performed by grasping the polypus with the finger and thumb, or a pair of forceps, and twisting it gently round until the stalk breaks. Cellular polypi are the best adapted for this operation, and small fibrous polypi with thin and narrow pedicles. The most approved operation is that by ligature, and the instrument which our author uses is Gooch's canula, at the outer end of which a rack has been superadded, so that the ligature may be tightened from time to time by turning the rack. The ligature which Dr. Lever prefers is whipcord, he says "It has been shown by Mr. Walne, in the 'Medical Gazette' for July, 1836, that whipcord when moistened, increases in thickness, but diminishes in length; therefore such a ligature after its application, and when bathed in the discharges, will tighten itself very considerably." (p. 94.) Excision has been recommended by many authors. The only objection which our author has to it is the liability of subsequent hemorrhage. We may mention that an experienced surgeon of the present day recommends the twisting of the pedicle two or three times round before excising them, by this means, he says, the hemorrhage is prevented; this proceeding can only be followed in small polypi with thin necks. Of the actual cautery we know nothing as a remedy for polypus.

The cases which follow are interesting and illustrative of the practice recommended, and especially case xx, as showing under some circumstances the necessity and safety of applying the ligature during pregnancy. The case referred to is that of a woman four months advanced in pregnancy, who had been suffering from repeated losses from the vagina. When Dr. Lever saw her she was anemic from the loss of blood; on making an examination per vaginam, a polypus was discovered growing from the os uteri, of the size of a hen's egg. Such was the condition of the woman, that Dr. Lever feared further loss, and the ligature was applied. In seven days the polypus was detached; her health rapidly improved; she went her full time and was delivered of a living child.

In the case of polypus combined with pregnancy, our author considers that if the polypus do not interfere with the general health, or by its size will not obstruct delivery, the operation ought not to be performed till after delivery. If symptoms arise from its presence, or the tumour is too large to admit of delivery, its removal ought to be effected. When its removal is contemplated for the latter cause, excision must be the remedy, and Dr. Lever recommends the application of the ligature previous to excision, to prevent hemorrhage.

Uterine tumours. Under the term "hard, fleshy or fibrous tumours," Dr. Lever includes "those tumours of the uterus for the most part non-pediculated which are either non-malignant, or if malignant possess that characteristic in a very low degree." (p. 109.) They may arrive either

from the subserous tissue or from the cellular tissue of the uterus itself, and sometimes they are generated beneath the mucous lining. They may be developed in any part of the uterus, but are more frequently found in the body and fundus. They vary in size from a pear to the pregnant womb, and are found of all forms. Those situated in the substance of the womb we have generally found to be of a rounded form, whilst those situated under the mucous tissue, frequently present a pyriform shape, project into the cavity of the uterus, and have a polypoid character. There is nothing known respecting the formation of these tumours. In most instances they arise without any assignable cause. At other times their origin has been attributed to a kick or blow, or coagulum of blood. These tumours are more frequently seen in unmarried and sterile women, though occasionally they complicate pregnancy.

The symptoms which attend these growths are in many instances so slight as not to attract attention until the tumour has attained a large size and produces pressure on the surrounding viscera. These symptoms will vary according to the situation of the tumour. If it be situated on the anterior part of the uterus, the bladder will be pressed upon and there will be frequent desire to make water; if on the posterior part of the uterus, the rectum will be encroached upon producing tenesmus, hemorrhoids, &c. In one instance which came under our notice, the pressure upon the rectum was so great as to require the introduction of a tube for the evacuation of the fecal matter. If the tumour be situated on the side, cramp and numbness of the inferior extremity will be present. Dr. Lever states that in one case in which the tumour was attached to the fundus, retroversion of the womb was produced, and the patient died from the effects of the displacement. Amenorrhea may or may not exist, and when the tumours arise from the submucous tissue, there are usually frequent attacks of hemorrhage which produce all the symptoms of anemia. The mammæ sometimes sympathise with the morbid changes going on in the uterus, and become enlarged.

These tumours are liable to be mistaken for pregnancy, congestion and induration of the womb, scirrhus, polypus of the uterus, ovarian disease, and various abdominal tumours; we refer the reader to the work itself for the various diagnostic marks.

Unless interfered with, these tumours may remain stationary for many years without interfering with the comfort of the patient, except that arising from their bulk. When, however, their size is such as to interfere with the functions of the bladder or rectum, death is sometimes occasioned by the mechanical obstruction. More frequently the tumours become inflamed from some accidental cause or from pregnancy; they soften in their centre, and destroy life by the constitutional excitement produced by the morbid changes in their substance. In regard to treatment, our remedial means have little influence over these hard tumours; and we quite agree with Dr. Lever, that the less done to them the better. To preserve the general health as good as possible, to avoid all causes likely to produce inflammation, and to meet the symptoms as they arise, are the principal indications of treatment. Sir C. Clarke mentions the spontaneous removal of these tumours; and our author says, "it may reasonably be asked, if such tumours are capable of spontaneous ab-

sorption, is it not probable they may be absorbed when the constitution is influenced by those remedies which are known to possess a peculiar and specific influence on that system?" (p. 119.) Dr. Ashwell believes, from his own experience, that iodine has some effect upon these tumours, and that the small hard tumours of the cervix may be "melted down and cured by iodine." Dr. Lever does not speak so sanguinely of this remedy, although he states he has seen a stop given to the growth of the tumour after the exhibition of iodine. We have tried iodine liberally, but without producing any sensible effect: it is, however, a remedy well worthy of further trial. When the tumour presents a polypoid character and projects through the os uteri, Dr. Lever recommends its removal by ligature or excision; but at the same time remarks that "the breadth of the base or uterine attachment is frequently so considerable that removal by ligature is seldom accomplished." (p. 121.) We are of opinion that it is our duty, in all cases where the tumour presents through the os uteri, and the ligature can be applied, to apply it, even though the portion to be removed be small; for experience has shown that the remaining portion will in time descend and project through the os uteri, and admit of the application of the ligature a second or third time, and thus the morbid structure may, in some instances, be removed as it were by instalments.

On the subject of pregnancy, associated with hard tumours of the uterus, Dr. Lever has made some very judicious and practical observations; and in the measures recommended by him for the relief of the patient we entirely coincide. We would only observe, that in those melancholy cases when the tumour obstructs the passage of the child at the time of labour, it is our duty to give full trial to the efforts of nature before artificial means are resorted to; for cases have occurred—and especially one related by Dr. Beattie in the 'Dublin Journal'—where the diameter of the pelvis was so diminished as to lead him to think that the Cæsarian section would be required; yet, after some time had elapsed, the tumour was drawn up by the action of the uterus, and allowed the child to be extracted.*

Cauliflower excrescence and corroding ulcer of the uterus are well detailed, and the description contains all that is at present known upon the subjects.

Cancer of the uterus is considered in a very elaborate article. The author gives the different varieties of it, and states the opinions of various writers on its pathology. He acknowledges the hereditary character of the disease, but does not believe that it can be communicated by infection or inoculation. From tables here given it is shown to occur very frequently: out of every seven cases of uterine disease, cancer of the uterus existed once. With regard to the exciting cause, he does not think that syphilis and violence will produce the disease, unless the cancerous diathesis exists. The results of his tables lead him to the opinion that unmarried women are less liable to be attacked with this disease than married women; for, out of "120 cases of carcinoma, unmarried women bore a proportion of 5·83 per cent., married women 8·66 per cent., and widows 7·5 per cent.; and the same tables show that the disease which

* See Dublin Journal, July, 1840, p. 411.

most frequently precedes cancer is congestive dysmenorrhea. The symptoms of cancer in its several stages are well described, and also its diagnosis. With regard to the treatment of cancer, our author does not advance anything new. He is very partial to the administration of arsenic in the first and second stage of the disease, and he says he "has reason to be satisfied with its 'modus agendi.'" We are glad to find that Dr. Lever does not speak favorably of the French practice of applying caustics to the ulcerated surface. It is of very little use to remove the surface whilst the parts underneath are affected with the disease. As to the radical cure of the disease by complete or partial excision of the uterus, we have but one opinion. Our author devotes about twelve pages and a half of his work to the consideration of this subject and does not speak in favour of it. The cases which have been recorded of the extirpation of the whole uterus do not place the operation in a very favorable light; most of the subjects of them have died within a short time after the operation, some in a few hours; and in those cases where the operation has been supposed to be successful the disease has reappeared and carried off the patients. There can be no doubt that the uterus may be removed with impunity; but the question is, can the cancerous uterus be extirpated with a prospect of success? All accounts of the operation speak to the contrary; nor, indeed, is it likely it should be otherwise. The operation is never recommended until ulceration has taken place, at which time the system is already contaminated by the disease. In this case, although the local ravages of the affection may appear to be limited to the uterus, yet it is impossible to speak positively upon this subject. It is of little use to remove the local affection whilst the morbid diathesis remains behind. The same objections apply to the excision of the os uteri in this disease. The difficulty of determining the exact limits of the disease, and the unwillingness of the patient to consent to so severe an operation until all the ordinary remedies have been tried in vain, (when the legitimate period for its performance will have passed away,) are such serious objections as ought to deter every surgeon from performing it. Excision of the os uteri has been recommended in cauliflower excrescence, and our author quotes a successful case of Dr. Simpson of Edinburgh. The woman rapidly recovered from the operation, and in a short time became pregnant, and was delivered in due time without any untoward circumstances. We may add from authority, that this patient has been again pregnant and delivered, and was, at our last report, in good health.

We have thus gone through the principal diseases treated of by our author; and although we have met with nothing very original, we have been, nevertheless, much pleased by the perusal of the work. Besides materials from other sources, it contains the results of the author's own experience, and is fully illustrated by cases which have come under his own immediate observation. It is written with great clearness and simplicity, and the concise but sufficiently full details of the various diseases of which it treats interest without wearying the reader. Every part of the volume exhibits good sound sense and correct judgment. The junior practitioner will find it a safe and sufficient guide to enable him to understand the various diseases of the uterus, and, so far as our present knowledge admits, to conduct the treatment of them successfully.

Art. XVI.

Some Account of Cretinism, and the Institution for its Cure on the Abendberg, near Interlachen, in Switzerland. By W. Twining, m.d. —*London*, 1843. 8vo.

Felix Platner in 1611 thus graphically pictured those miserable beings who still, as then, vegetate in the valleys of Switzerland, as if Nature, delighting in strong contrasts, had given human pride a lesson of humility, by placing amidst some of the most exquisite of earthly scenes the lowest, loathsomest specimens of human nature: "There are," says Platner, "some stupid creatures who besides being born so, have other vices of conformation. They are chiefly seen in the valleys, sitting at the doors of the cottages, staring upwards, or playing with sticks in their hands, and grinning at passers-by. Their heads are mis-shapen, and mouths and tongues so thick and swollen that many are unable to articulate sounds. They were indeed hideous to see."

These are the Cretins of the present day, the numbers of whom, it is supposed, amounts to 8000 completely idiotic, and double or treble that number who are more or less affected. A statistical survey, however, has been undertaken, which will give some certain information.

The word 'Cretin' is said to be derived from 'crætira,' which, in the Romance or old Italian language, (still prevalent in a part of the canton Graubündten,) means "a poor creature;" a word very significant of a disease which consists essentially of such an enfeebled state of both body and mind as unfits them for the commonest purposes of life. "*The* sole condition which prevails in all is a want of tone or energy, *evident* either in the whole being or in a particular series of organs." *Cretin*ism and goître have often been confounded, as one and the same disease. They commonly coexist; but there are many 'Cretins' that have not 'goître,' and vice versâ. In extreme cases the head is mis-shapen, the limbs and body deformed; the Cretin can neither hold up his head, stand, or walk; he is deaf and, consequently, dumb; his eyes give him no definite sensation; and his taste, smell, and touch are similarly defective: he is so dependent on others "that a day of neglect would be the day of his death."

Dr. Guggenbuhl, a Swiss protestant physician, struck with the wretchedness of these beings, has, with a zeal, devotion, and earnestness of purpose worthy of all praise, devoted his life to the amelioration of their condition. For two years he lived in one of the small valleys in which Cretinism was endemic to study the disease; he then travelled over Switzerland to ascertain its localities; and having satisfied himself as to the means of cure, he called the attention of his countrymen to the subject, and has been enabled to begin his benevolent experiment on a small scale.

Dr. Guggenbuhl believes that in four cases out of five the disease consists in a want of due bodily vigour, which renders the senses incapable of conveying external impressions to the mind; and not in the non-existence of the mental faculties; or, in other words, in no organic defect of the material organ of the mind; and his treatment consists in improving the bodily health by air, exercise, diet, frictions, baths, and

medicines, and in subsequently rousing the inert senses by a steady course of instruction. The only cause which he has found to be constant in all those localities in Switzerland where Cretinism is endemic, is the damp warm air of close valleys among the mountains where there is no free circulation; and it is an essential feature of his plan, that the institutions for the cure of this disease should be situated in high mountains, far above the altitude of any of the valleys in which it prevails. For this purpose he has purchased a cottage on the Abendberg, near Interlachen, 3600 feet above the level of the sea, which is 1000 feet above any place where Cretinism is endemic. Ascending a steep mountain, amongst thick fir forests, the traveller at last arrives at an open space of grass-land, on which is a cottage—a spot of rare beauty, with ranges of mountains covered with snow above, and far beneath, a lake and the green valley of Interlachen. This cottage is the field of this Swiss physician's self-denying labours. "I myself," he wrote to his countrymen, when urging the claims of these poor idiots, "will dedicate my life and all my powers to this sadly-neglected class of mankind; and, regardless of all difficulties, will strive to realize the wish which day and night is the continual subject of my thoughts." And here he is carrying out his heroic purpose, surrounded by children in every stage of imbecility of body and of mind. He has an assistant who has had experience in the instruction of the deaf and dumb, and "Sisters of Charity" act as nurses. The bodily health is first attended to, and the fresh mountain air, proper food, cold baths, and frictions soon enable those to walk and exert their muscles who on their entrance could not walk steadily or feed themselves, or even could not hold up their heads or move their limbs. As soon as the health is sufficiently improved, education is begun. The ear is first roused by speaking through ear-trumpets, beginning with the vowels. The child is then taught to perform with its mouth the motions required to express the sound, so as to connect the sound itself with the mode of expressing it, so that the pronunciation is by degrees attained. Letters are carved in wood, by means of which the child connects them with the sounds, either by touch or sight. Thus the children gradually form words which they utter. Next common utensils—as knives, keys, &c.—are painted, and they learn to place the instruments themselves on the pictures. Sometimes, when this process does not avail to fix the sight on an object, marks or letters are figured with phosphorus on the walls of a room, and then the instruction begins, in winter, after sunset, or in summer, in a darkened room. And this method often proves effectual, when others fail. Smell and taste also need development, as many would swallow whatever was placed in the mouth, and would pay no attention to any odour. "And when the hour of instruction is over, the benevolent physician devotes himself to their amusement."

A child admitted at two years of age, a senseless mass, unable to hold up her head, or move her limbs, was so much improved in bodily vigour, in three months, as to be fit for instruction, and a year afterwards was strong, able to walk, and feed herself, knew all parts of the house, could say her letters and many words of one syllable.

A boy, six years old, when admitted could scarcely walk, could not fix his dull eyes on any object, could not speak, and his only sound was like the cry of an animal. It required a month's constant effort before his attention could be directed to any object. A year afterwards his

countenance was intelligent, he could walk, feed himself, and pronounce his vowels distinctly. The first three-quarters of a year was given to bodily improvement only.

A girl eight years old, could neither feed herself nor stand eight months ago. Now she has the full use of her limbs, and education is begun. As soon as they are rendered fit to employ themselves in some manual occupation, and to receive ordinary instruction, they are no longer considered as cretins, but are sent to their homes and to the village schools. Three have already left.

Cretinism is often but not always hereditary. "If a child born apparently in good health does not continue to be well developed during the first year, it is observed that nutrition first fails, then the powers of speech and walking, and then the arrest of development becomes complete, *if* the child is not soon placed in the most advantageous situation." Therefore if the disease is to be arrested, the treatment cannot be begun too early, and one of the rules of the Institution is, that none will be admitted after six years of age, but this is not rigorously adhered to.

We have drawn this sketch from the pamphlet, whose title is *prefixed* to this notice, and which is written with good sense and good feeling. Dr. W. Twining personally visited the small establishment on the Abendberg, and became so much interested in the undertaking as to endeavour to awake attention to it in England, and a committee is organized to collect subscriptions.

Although we have ourselves no cretins, yet practically this history may be useful by enforcing the great lesson that cannot be learned *too often*; that hygienic means, pure air, exercise, and diet are the important *remedies* for restoring muscular strength and nervous energy; *that the development* of the mental powers is greatly dependent on the *due development* of the bodily ones, and hence in the weakly or debilitated, the general health must be improved as the necessary preliminary step to education; that inattention in the child to the impressions of the various senses is often a symptom of deficient nervous energy, and one that is to be remedied by improving the bodily strength, and by awakening the attention of each sense, the assiduous and long-continued application of its own appropriate stimulus; and that this "malady of not marking," this deficient power of attention, so injurious to the strength and usefulness of the mind subsequently, should be regarded not indolently as an almost hopeless mental defect, but as a disease which requires for its cure or improvement bodily as well as mental remedies.

It would be an unpardonable neglect to conclude without strongly expressing admiration of Dr. Guggenbuhl. It is a good thing occasionally to find a man, (and one of our own calling,) thus giving up his life to an object of pure, unmixed benevolence; sacrificing everything to a "wish which is the continual subject of his thoughts," when that wish is, not success in life, nor mere honours, nor the carrying out of some scientific object, nor any minor hobby such as men are often possessed by, but to raise to the condition of human beings, a body of his fellow-countrymen who have hitherto been consigned to helpless, hopeless idiotcy.

Dr. Twining's pamphlet is simply, unostentatiously, and agreeably written, bespeaking an acquaintance with his own profession, a cultivated mind, and what is better, a pains-taking interest in the welfare of his species.

Art. XVII.

The Sources of Physical Science; being an Introduction to the Study of Physiology through Physics, comprising the connexion of the several departments of Physical Science, their dependence on the same Laws, and the relation of the Material to the Immaterial. By Alfred Smee, F.R.S., Surgeon to the Bank of England, &c.—*London*, 1843. 8vo, pp. 296.

Mr. Smee is well known to the scientific world, as the inventor of a valuable modification of the Voltaic battery, and as the improver of the electrotype process, which is now so widely introduced into the arts and manufactures,—mainly, we believe, through the development given to the original idea, in his ingenious and fertile mind. We had the pleasure, not long since, of noticing a second edition of his treatise on Electro-metallurgy; and the volume before us is a fresh evidence of the zeal and industry with which he pursues his scientific inquiries, in the midst of professional avocations, and we may say in connexion with them: for, as we learn from the preface, it is the first offspring of an attempt, in which the author has long been engaged, to "investigate the physical structure of man, and to endeavour to unravel the mysterious means by which all physical forces, when acting on the human frame, are converted into nervous impressions." Such an inquiry, conducted by an individual well versed in physical science, and with a competent knowledge of physiology, holds out much promise of valuable results. It is only when all the operations, for which the laws of physics can account, have been investigated and set aside, that we can distinguish the purely *vital* operations, the laws of which constitute the science of physiology; and the boundary between the two is very far from being distinctly marked out.

For the better examination of the sources, from which the various phenomena of physical science originate, Mr. Smee intended to draw up a slight sketch of the inquiry, to form an introductory chapter to his physiological investigations. But finding that it extended to a much greater length than he had anticipated, he determined to publish it as a separate treatise, in the hope, as he modestly expresses himself, that the compressed view of the subject which it contains, might possibly lead those who possess greater time and opportunity, to devote their attention more particularly to the essential nature and mutual relations of the various divisions of physical science. "If I shall hereafter find," he says, "that my labours have been useful to society, or have induced others to produce a more perfect treatise, I shall feel most amply rewarded."

Although nearly resembling in its title, the well-known 'Connexion of Physical Sciences' of Mrs. Somerville, the work of Mr. Smee essentially differs from it in plan and objects; his purpose being rather to exhibit the *fundamental* connexion between them, by showing that their varied phenomena are produced by agencies of the same character; whilst *hers* is rather to show the conjoint participation of several agencies in the phenomena of the respective sciences. If we might illustrate our meaning by a simile, we should say that the one aims to show the connexion of the branches into a common trunk, whilst the other demonstrates the interlacements of their ramifications.

We may best give an idea of the plan and scope of Mr. Smee's work, by the following summary, with which it concludes:

"Matter is matter, and solely exists by the will of God.

"Matter is made up of finite particles, or atoms; a series constituting number, and the study of number, arithmetic.

Particles of matter *attracted together* give rise to . . .	Form, Volume, Composition, Cohesion, Adhesion, Position.
Peculiarity in the *direction* of attractions produces . .	Crystallization, Polarity, Magnetism.
Attraction *acting on* attracted matter causes . . .	Tension, a tendency for action, Force, a capacity for action
Force, by *destroying* the attractions of attracted matter, exhibits	Galvanic phenomena, Electric ditto, Electro-magnetic ditto, Motion, Disintegration, Decomposition.
The results of force, in consequence of the *resistance* of old or previously-existing attractions, produce the phenomena called	Time, Heat, Light, Sound, Odour. (?)
These latter, being the result of force, exhibit .	The effect of force generally, and therefore capacity for the destruction of attractions."

Into the details, it is scarcely our province to enter; but having bestowed some time and attention on the perusal of the volume, we feel qualified to offer an opinion as to its merits. A large proportion of it consists of scientific *facts*, of which some are familar to every one, whilst others are less generally known; but they are all placed in new and frequently very striking positions, so as often to present themselves under an aspect entirely different from that in which we have been accustomed to regard them. Hence no one can attentively read the book without feeling a strong interest in it, and experiencing benefit from it. But we are bound to add, that the execution of the philosophical portion of the treatise is in our opinion inferior to its plan; and that, in his anxiety to avoid abstractions, the author has fallen, in many instances, into what appear to us very grave errors. We cannot think he is right, for example, in the adoption of *number*, as one of his three fundamentals, along with matter and attraction, (Preface, p. vii;) since it is merely the repetition of matter, and not anything distinct from it. Nor can we regard any philosophical system as correct, which introduces *time* into the same category with heat, light, &c., and classes it as a *material property*. We doubt if the way is yet clear for the kind of generalization at which Mr. Smee has aimed; and we think that, when the period does arrive, the advance will probably emanate from a mind more experienced in philosophic speculation,—that, for instance, of a Herschel or a Faraday,—than it is fair to expect Mr. Smee's at present to be. Nevertheless he has produced a work, which possesses many claims upon the attention of those who are interested in physical science, and which will serve, we trust, the purposes at which he has aimed. His own *forte* evidently lies in the *application* of principles, rather than in their development; and we expect much from his promised experimental investigations into the physical phenomena of life.

Art. XVIII.

Beiträge zur Kenntniss der Kranken Schleimhaut der Respirationsorgane und ihrer Producte durch das Mikroskop. Von Fr. Bühlmann.—*Bern*, 1843. Mit Taf. 3.

Contributions to the Knowledge of the Microscopic Characters of the Mucous Membrane of the Respiratory Organs and its Products. By Fr. Bühlmann.—*Bern*, 1843. 4to, pp. 82. With Three Plates.

There is not much that is new or very important in this work, (the author's inaugural dissertation for the doctor's degree at Bern;) but all "contributions" to the knowledge of the diseases of the respiratory organs, already so carefully studied without the microscope, must be thankfully received.

The first section of the first part of the dissertation contains a description of the external characters of sputa; the second is given to the normal products of mucous membranes. Neither of these has anything important in it. In the third is an examination of the morbid products of the respiratory mucous membrane which the author describes under twelve heads, as follows:

1. *Pus and its corpuscles*, which he considers (as his friends Valentin and Gerber do) to be modified exudation- (lymph-) corpuscles, having, as intermediate stages in development or degradation, the various forms of mucous corpuscles. His description of the corpuscles themselves has nothing novel; but of the diseases in which he finds pus, he gives a longer list than is usually admitted.

"In consequence of irritation, exudation-corpuscles form, which, by division and by the taking-up of fatty matter, pass through the middle stage of the so-called mucous-corpuscles into the proper pus-corpuscles. These middle states we find especially in slight degree of coryza, after the first excitement is over; at the commencement of all catarrhs; in slight forms of bronchitis on the second or third day after secretion has begun. Completely formed pus-corpuscles are found in all chronic catarrhs in a later stage when the secretion, at first transparent, begins to grow turbid and yellowish; and in the second stage of every severe nasal catarrh; in these they form with especial rapidity..... We find pus, moreover, in the second stage of every severe bronchial catarrh or bronchitis; and in phthisis, in the stage of crude tubercles as well as with open cavities. .... In chronic pneumonia also, and in bronchorrhea, there are pus-corpuscles in great number. There are few chronic catarrhs in which the expectoration does not consist of completely purulent constituents mixed with the middle states of pus, the mucus-corpuscles. As soon as grayish or yellowish spots form in the frothy transparent catarrhal expectoration, these consist, for the most part, of pus. The yellowish, copious, homogeneous sputa of the consistence of a balsam, which one sees in chronic catarrh, and which are exactly like the expectoration of phthisical patients, always contain the most perfect pus." (pp. 38-9.)

2. *Morbid epithelia.* The author says that in irritation of the respiratory mucous membrane there is never a profuse shedding of the epithelium previous to the discharge of exudation- or mucus-corpuscles; and he fairly advances this as strong evidence against the notion of Vogel and Henle, that these corpuscles, as well as the pus-corpuscles, are formed from the younger epithelial cells; because these could not appear till the old ones had been cast off.

All kinds of epithelia, and in all their stages of development, are found in sputa; and sometimes their forms appear altered by disease; but the several changes of form cannot be connected with any corresponding forms of disease. The author says, however,

"I have always found a peculiar kind of ciliary epithelium at the beginning of common nasal catarrh. .... Its form is truly protean as long as the ciliary movement continues. The cells are most frequently roundish, often quite circular, often conical with either lateral or central ciliæ; sometimes they are long and divided in several parts; the same cell which in one moment is exactly circular, with a central nucleus and tuft-like ciliæ, is in the next turned round, and now is a ciliary cylinder or an oval or conical body. The ciliæ are like those fully developed, but longer; and they turn in the most beautiful flapping manner from right to left, and in the reverse direction, making each time two distinct bends... .. The roots of the ciliæ are here, also, very distinct; they are thicker than the ciliæ themselves, and contain nuclei, but no nucleoli. The colour of the cells is pale and clear; and they are transparent as far as the semi-transparent part on which the roots of the ciliæ are seated..... The existence of cells of this kind is short and very transitory; they are hardly found before they gradually diminish in number, and they disappear completely as soon as the first violence of the coryza has passed off; which often takes place in twenty-four hours, and sometimes even in twelve hours." (pp. 41-2.)

Their nature and their origin and mode of formation are at present obscure.

3. *Albumen-granules.* These, and the large granular corpuscles, (Gluge's *compound inflammatory globules,*) formed by aggregation of granules, are very rarely found in the acute diseases of the respiratory mucous membrane, but are abundant in chronic bronchitis, *phthisis,* bronchial blennorrhea, and generally in the expectoration of persons whose blood is defective in fibrin, and in that of chlorotic persons.

4. *Exudation-corpuscles,* such as first received this name from Valentin, and such as Gerber supposes to be the normal organized deposit from living fibrinous fluids, are found abundantly in the products of disease of the mucous membrane of the respiratory organs, nor can there be any better occasion for observing them than is afforded in the early stages of a common coryza. They are at first spherical, but at a later period, lens- or cake-shaped nuclei, yellowish-white or pale red, and containing nucleoli. In size they vary from 1-400 to 1-320th of a line in diameter. By mutual pressure and adaptation they become polygonal. In this state they may be stationary; but when more highly developed they become cells; and when retrograding they pass (apparently very quickly) into the state of pus-corpuscles. In the transition to these states their forms are variously altered; and, especially, though at first their surface is smooth and uninterrupted, they become as if grooved and cracked. The diseases in which these corpuscles are most abundantly found are nasal catarrh, the more acute bronchial catarrh (even from its commencement), and the early stages of phthisis.

5. *Blood-corpuscles,* in their normal or in variously altered forms, are found much more commonly than they can be discerned by the unassisted eye. "In pneumonia, when the blood at first is not yet intimately mingled with the rest of the sputa, the blood-corpuscles are quite normal, or at most somewhat swollen; but when the mixture is fully effected they

are almost always much altered, and in the *prune-juice* expectoration, nothing can be found of them but rudiments of nuclei, and the fluid coloured by them." (p. 53.)

6. *Melanotic structures.* These occur in two forms: First, as cells containing points of black pigment; and secondly, as loose pigment. The cells are very like small tesselated epithelium-cells; some not larger than blood-corpuscles, others as large as the epithelium-cells of the mouth. The pigment, which appears to be formed in the cells as they are being developed, is distributed in them not uniformly, but in patches. In the most developed cells, the dark particles produce complete blackness; and some of them are elongated into the form of caudate bodies. Loose black pigment granules are also often found in sputa, of the same kind as those in the cells. Both together occur very frequently in phthisical expectoration, especially in patients who have cavities, in whom they are probably derived from the ulcerated pulmonary tissue. Pigment of the same kind is also found abundantly in diseased black bronchial glands.

7. *Tuberculous matter.* On this the author gives the descriptions of his predecessors, and acknowledges that he cannot clear up the obscurity which rests upon the subject, concluding only that the *tuberculositas pulmonum* cannot be discerned by any peculiar microscopic tuberculous substance, and that there is no substance found in the expectoration of phthisical patients which does not also sometimes occur in those otherwise affected.

8. *Crystals* of the various salts contained in the secretions and crystals of cholestearine are often found abundantly in expectoration; but they appear to be subject to no other general rule than that they are usually most numerous in sputa which have lain long, and been permitted to evaporate their fluid parts in the air-passages.

9. *Fatty matters*, in globules of oil, and in particles of stearine are also often found in phthisical and other kinds of expectoration. The consistent cerate-like fatty matters containing most stearine appear to be products of disease of the mucous glands, and are especially abundant in chronic bronchitis.

10, 11, 12. Under these heads the author mentions the occurrence in the expectorated fluids of portions of the normal tissues destroyed by sloughing or ulceration, portions of morbid growths from the mucous membrane, and various accidentally mixed substances; but we need not extract any of this portion of his treatise.

In the second part of the work he speaks of the microscopic examination of the mucous membrane of the respiratory organs in the diseased state; and in the third part he gives briefly the results of his observations. These, as he himself admits, are few and unsatisfactory, little better than some probable negatives, which our readers may easily themselves draw from the analysis which we have given. We are bound to add, however, that the merit of the author is not to be measured by the importance of his results; he must have worked hard to produce such a dissertation; and his honesty must be praised since it has prevented his attempting to make that clear by unfair means which is in itself obscure and uncertain.

Art. XIX.

The Epidemics of the Middle Ages. From the German of J. F. C. Hecker, m.d. Translated by B. G. Babington, m.d. f.r.s. *Printed for the Sydenham Society.—London,* 1844. 8vo, pp. 418.

It is with the most lively pleasure that we copy the above title, and thereby introduce to the notice of our readers *the first publication of* The Sydenham Society. We have received the volume at so late a period, that we have no space left for noticing it any length. We should not, however, have "reviewed" it, according to the ordinary meaning of the word, if it had reached us earlier—and for these among other reasons: The book, in the first place, is not *published for sale,* but for distribution among the members of the society; and, secondly, it will obtain so very wide a circulation in its destined channel, that it seems superfluous to give any detailed account of it in the journals.

We observe by the list appended to the volume, that the number of members of the Sydenham Society, at the time of going to press, was within a few of 1600; and we have reason to believe that new names are coming in daily. It no longer then admits of doubt, that this society will eventually comprehend the majority of the members of our profession in the three kingdoms. Its present triumphant success need excite little surprise when this single fact is considered, that the subscribers will annually receive back, in the shape of valuable books, *double* the amount of their contributions.

The present beautiful volume is one of three, (possibly of four,) to be presented to the subscribers of 1843. These volumes, if published, would probably sell for fourteen shillings each. Two other books of the same size, or larger; viz. The *Latin* Sydenham, (the *English* will *be delivered* next year,) and the translation of the new edition of Louis *on Phthisis,* are nearly through the press, and will soon be ready for the members.

Although not intending to review this book, it would be most ungracious to the translator of it, to let even this notice go forth to the public, without the expression of our opinion as to its merits. The translation is admirable. It reads so like an original English book, that it might easily pass for such,—and for an elegantly-written book too. It contains three treatises by Dr. Hecker: *The Black Death, The Dancing Mania,* and *The Sweating Sickness;* and to these Dr. Babington has most judiciously added a reprint of the very rare '*Boke or Counseill against the disease called* The Sweate *or* Sweatyng Sicknesse, *made by* Jhon Caius, *Doctour in Physicke;*' and first published in 1552. This curious tract, with its quaint style and antique spelling, adds greatly to the interest of the volume. We have only to add that Dr. Babington has generously presented the copyright of this work to the Sydenham Society, besides taking on himself the whole trouble of editing it, and seeing it through the press.

All things considered, we regard the foundation of The Sydenham Society as one of the most important events that has taken place in the history of the profession in this country, during the present century. The fact of so very large a number of practitioners being enrolled members of it, within the first year, and in every part of the kingdom, gives reasonable grounds for hoping that the taste for good, sound medical literature, is again reviving, and will, eventually, most beneficially qualify, if it do not entirely supersede, that depraved appetite for mere medical gossip, and the frothy inanities of extemporaneous journalism, which has obtained such a head in this country, during the last twenty years.

PART SECOND.

Bibliographical Notices.

ART. I.—*Elements of Natural Philosophy; being an Experimental Introduction to the Study of the Physical Sciences.* By GOLDING BIRD, A.M. M.D. F.L.S. &c. &c.—Second Edition, revised and enlarged.—*London*, 1844. 12mo, pp. 480.

WE have great pleasure in welcoming a new edition of this excellent work, which we strongly recommended to our readers on its first appearance, a few years since, and which now presents still stronger claims upon their attention. Its form has been altered to that of the beautiful series of Manuals now in course of publication by our enterprising publisher Mr. Churchill; but though the size of the book has been thus reduced, the amount of matter it contains has been considerably increased. Three new chapters have been added, embracing Thermotics, or the Science of Heat, (the introduction of which we had suggested in our former notice,) and an account of the Chemical Action of Light, in regard to which so many interesting and important discoveries have been made during the last few years. The chapters on Electrical Decomposition, and part of those on Polarized Light have been rewritten, so as to bring them up to our present more advanced state of knowledge; and many improvements, calculated to elucidate whatever appeared obscure, and to facilitate the labours of the student, have been effected in various parts of the work—not among the least of them being the addition of about eighty additional woodcuts. We do not hesitate to pronounce this little volume the best Manual of Natural Philosophy in our language; and we much doubt if it is equalled—surpassed it can scarcely be—in any other. We trust that the simple and concise form in which the most important truths of physical science are thus presented, will not be inoperative in leading the medical student to gain that degree of acquaintance with them, which is valuable alike as a preparation for his professional pursuits, and as enabling him to take that superior station in intelligent society which he ought to maintain, and which, in these days of general diffusion of scientific information, is not so easily acquired as formerly. Dr. Golding Bird's labours should be not the less acceptable to those who desire to prevent the knowledge which they may have formerly acquired on these subjects, from being forgotten; and who aim at keeping pace, in some degree, with the rapid advance which the physical sciences are at present making.

Art. II.—*Glossology, or the additional means of Diagnosis of Disease to be derived from Indications and Appearances of the Tongue.* By Benjamin Ridge, m.d.—*London*, 1844. 8vo, pp. 84. With Plates.

Dr. Benjamin Ridge asserts in this volume that certain parts of the tongue are so connected, anatomically and physiologically, with the various viscera, and are so influenced by the affections of those viscera, that the diagnosis of individual disease can be learned from its inspection alone. Mapping out the tongue, like a phrenological bust, he asserts that the sides belong to the kidneys, the tip to the large intestines, the edges to the brain, &c.; and dividing its surface into a dozen smaller compartments, he tells us that one of these little squares belongs to the larynx and trachea, another to the bronchi, a third to the minuter bronchial tubes, a fourth to the pharynx and œsophagus, a fifth to the stomach, and so on.

The author of these "novel disclosures" (as he terms them) discourses magniloquently on his truths being buffeted, beaten down, and trampled under foot for the time by his opponents, and consoles himself with the lofty stoicism that "it is satisfactory to think a future generation will sit in judgment between them and me." The "novel disclosures" are proved, not by cases, not by post-mortem examinations, but by bare assertion that such a connexion does exist. For instance:

"The short-piled gray, or slate-coloured velvety tongue, is connected with a state of the system most difficult to manage. It is diagnostic of the firm hold which the close morbid deposit has upon the surface of every mucous membrane throughout the body."

A close morbid deposit firmly adherent to the whole gastro-intestinal mucous membrane, to the lining of the mouth, ears, nares, larynx, trachea, and bronchial membrane, to the conjunctiva, urethra, bladder—and indicated by a slate-coloured tongue! And this is the evidence on which we are called upon to receive these new revelations. It need not be said that such statements afford no satisfaction to any reader acquainted with the common rules for estimating the value of medical evidence. We here meet with assertions such as would not be justified by the largest experience. Morbid phenomena are explained as boldly and undoubtingly as if the internal processes could be actually seen; and then Dr. B. Ridge tells his readers that his observations have been made in a limited circle during the few years he has been in practice. (p. 75.) The mode in which he conducts his observations very clearly indicates that faulty method of mind which renders them valueless:

"It is my practice, in most cases, not to allow a patient to tell me his sick tale, till I have seen his tongue. When my observations and diagnosis are completed, I then say what is my opinion of his malady, requesting him to be candid with me, and state how far it agrees with what he has to complain of; should there be any difference, this leads me to examine the tongue more minutely. Something, probably, that might have been overlooked at first, is made apparent; or should this not be the case, and I see no reason to alter my first diagnosis, *I do not hesitate to differ from him; at all events, I am not misled by anything he has to say.*" (p. 52.)

We have quoted this at length, as it is a glaring and instructive ex-

ample of a *petitio principii*—taking for granted what is to be proved. Dr. Benjamin Ridge so firmly believes that his scheme is true, that he absolutely rejects what contradicts it.

Again—"One circumstance," says the author, with exquisite naïveté, "has troubled me in my researches, that I have not been able to find a place on the tongue for diseases of the uterus or the male genitals." Nature, alas, as she is apt to do, contradicts the theorist, and "troubles" him. He is forced to admit that the uterus "does play a prominent part" in the diseases of women, but how is it that there is no little square uterine patch left upon the tongue? "There must, I am sure, be some reason why this has escaped me, though I believe that organ to be affected very much through the imperfect or morbid action of other organs." He feels half-conscious that this unfortunate uterus spoils the uniformity and completeness of a scheme otherwise *totus teres atque rotundus;* and he partially comforts himself with the belief that, after all, the uterus is not so very important an organ; that it is not so often the primary seat of disease.

Dr. B. Ridge has evidently industry and zeal; but the predominating faculty of his mind seems to be a scheming fancy, which leads him with fatal facility to frame theories and to discover causes, and which disinclines him to subject these "novel disclosures" to the severe and painful scrutiny of the understanding—which scrutiny, however, supposes a training of the reasoning powers, to which such a mind has never submitted itself.

Taking those things for granted which are to be proved—putting assertions in the place of arguments—allowing the wishes to warp the belief—supposing a greater uniformity and order and completeness in things than ever can be found—are defects of so grave a kind in the mind of an inquirer, that no advancement in the discovery of truth can be hoped for until they are eradicated. The existence of such defects renders nugatory the assertions, statements, inferences, and disclosures of any writer in whom these deficiencies are conspicuous, who brings forward new views. The only use of such books as this is perhaps to the writer of them, who, by publishing to the world his own mental deficiencies, gets a chance of being informed of them in an equally public way; a dear experience in every sense, but not the less beneficial because somewhat unpalatable.

Art. III.—*The Distinction between Instinct and Reason. The Introductory Discourse to a Series of Lectures on the Properties and Functions of Animal Life, delivered before the Philosophical and Literary Society at Portsmouth.* By J. Strang, m.d., Vice-president of the Society.—*London* 1843. 8vo, pp. 44.

A very sensible and well-argued popular disquisition upon a knotty question, taking a medium view between the extreme opinions which have been upheld upon the subject, that corresponds closely with the one which we advocated in our Eleventh Volume.

ART. IV. — *Observations on the Proximate Cause of Insanity.* By JAMES SHEPPARD, M.R.C.S., *being an attempt to prove that insanity is dependent on a Morbid Condition of the Blood.* — *London*, 1844. 12mo.

ONE of our most irksome duties as reviewers is to read such a book as Mr. Sheppard's; which, under other circumstances, we should throw aside as useless after the perusal of a very few pages. Mr. Sheppard tells us that whilst reflecting on a drunken man he was impressed with the idea that insanity was at times connected with morbid conditions of the blood,—a very probable supposition; but on further reflection he came to the conclusion that there is presumptive evidence "that insanity is *universally* and essentially dependent on morbid conditions of the blood." This he "attempts to prove" by the faulty and exploded process of first framing a crude and hasty generalization from a few facts or opinions, and then finding or bending facts and arguments to prove it. He has brought forward no new facts, nor is there any internal evidence that the writer is at all practically acquainted with insanity. He has collected a few well-known truths showing that delirium and mania may coexist with excess in the quantity of the blood, and is relieved by depletion, and that puerperal mania is often the result of a deficiency in the quantity of the blood; but on the most important point, the alteration of its quality in insanity, we have none of that evidence which alone would be at all conclusive. By chemical analysis of the blood of the insane some new and useful information might have been collected, and in a book with this title such information was to be expected; but instead of cautious inferences drawn from pains-taking chemical research, *in connexion with a personal acquaintance with the disease*, we find that the author has been seeking fame by a much easier process, by collecting from a few well-known books the opinions of those authors most favorable to his own view, drawing from their opinions the loosest conclusions, and when these fail, putting "I doubt not . . I firmly believe . . I apprehend . . I can easily imagine" as the grounds on which we are also not to doubt, but to imagine easily, or believe firmly.

To show that we are not unfairly severe, we will quote three conclusions to which the author arrived:

"I have, I hope, made it appear in the preceding pages—

"1st. That insanity does not depend on disease of the brain.

"2d. That insanity cannot result from unappreciable lesion of structure.

"3d. That no conclusive evidence can be adduced in support of the position, that insanity can result from morbid conditions of the nervous system." (p. 33-4.)

And how have these conclusions been arrived at on these three important questions? By the numerical method? By a collection of original cases carefully analysed? By personal acquaintance with the disease during life, and by examinations after death? Or even by a deep acquaintance with the mere literature of the malady? By no means. But by a few well-known cases from a work of Dr. Abercromby's, and a few quotations of the *opinions* of a few writers on insanity, with the old experiment of Mr. Morgan's on the action of poisons, all made the basis of loose, inconclusive reasoning. Need we say that by this method truth can never be arrived at, or the bounds of medical science enlarged? The condition of the blood in so obscure a disease as insanity is well worth

investigating, and it should be subjected to chemical analysis by those who have the competent skill, the results compared with the analysis of blood in other diseases, and the connexion between its condition and the symptoms traced by those who are practically acquainted with the complaint. By some such process as this the question as to the relation between the blood and insanity may be settled, not by hastily assuming the fact that there is such a relation, and then proving it by words. It is true that the former method requires great opportunity of investigating the disease, chemical knowledge and skill, a cool judgment, and that rare quality the power of original observation; and that the latter is very easy, only needing a few books, pen, ink, paper, a lively fancy, no humility, and a very considerable opinion of one's own powers: but the one may benefit mankind by throwing light on one of the darkest defects of humanity; the other merely indulges an individual's egotism, vanity, and self-conceit.

Art. V.—*Lectures on the Theory and Practice of Midwifery.* By R. Lee, m.d. f.r.s. With numerous Wood-engravings.—*London,* 1844. 8vo, pp. 560.

Dr. Lee's recent work on Clinical Midwifery, showed him to have had unusually great opportunities of acquiring a practical knowledge of the obstetric art. The usefulness of that work, however, was somewhat diminished by the absence of those explicit directions, with reference to difficult points of practice, which are so essential for the guidance of the inexperienced. That want, however, is now fully supplied by the publication of these lectures, which form a most important addition to our obstetric literature. The first fourteen lectures are occupied with anatomical and physiological details, in which Dr. Lee has the great advantage of having been himself a diligent and successful investigator of those subjects which he describes. The next six lectures treat of the symptoms of pregnancy, and the disorders attending it; and the succeeding twenty-six are occupied with the description of natural and preternatural labours, and the treatment appropriate to each. In these lectures especially, Dr. Lee's lucid descriptions, his explicit directions, and the high tone of feeling which he everywhere shows, and earnestly inculcates, deserve the highest praise. The last seven lectures, from the thirty-eighth to the forty-fourth, are occupied with a notice of some of the chief diseases of the puerperal state—including puerperal fever, and phlegmasia dolens, with reference to which time seems to have confirmed the opinions expressed by the author in his Essays on some of the most important Diseases of Women.

The woodcuts which illustrate the work are well chosen and well executed, and the elaborate statistical tables which it contains are extremely valuable. It will, we doubt not, extend Dr. Lee's already high reputation, and be found extremely useful by practitioners generally as well as by students. They can have no safer or more enlightened guide. In the next edition, the index, which is now very imperfect, should be made much more complete; as facility of reference is a point of great importance in all works intended as manuals for students and men in practice.

Art. VI.—*The Vital Statistics of Sheffield.* By G. Calvert Holland, Esq. m.d., Physician extraordinary to the Sheffield General Infirmary, &c.—*London*, 1843. 8vo, pp. 262.

This book is named from the contents of its eighth chapter; it is in reality a statistical history of Sheffield. The first chapter commences, like most works on local topography, with a general description of the town and neighbourhood, and notices the four rivers thereto appertaining, the geology, the men of genius, the noblemen in the neighbourhood, the water company, the botany of the district, the ornithology, the quadrupeds, the fishes in the rivers. The second chapter is headed "rate of increase in the population," but discusses, in fact, its social condition and economical progress. The third chapter is headed "comparison between the present and past periods of manufacturing distress." The fourth chapter is an inquiry into the causes of unoccupied houses; and the fifth, a comparison of the cottage accommodation in Sheffield with that in other manufacturing towns. Dr. Holland discusses also the sewerage and drainage, the streets and roads of the town, and the expenses of the highways. The eighth chapter, headed "physical condition of the population," contains the vital statistics proper of the town. In subsequent chapters, we have the statistics of the savings bank, of crime, of the well-known manufacture of Sheffield, the silver and silver-plated manufactures, and the saw, edge-tool, spring-knife, file, and fork trades. Next come the statistics of friendly societies and secret orders, of education and religious instruction, of the mechanics' institute, the literary and philosophical society, and the school of design, of the medical charitable institutions, the licensed victuallers and beerhouse keepers, and the town-trust.

Our readers will see that Dr. Holland's subject is comprehensive enough to comprehend a great deal more than "the vital statistics of Sheffield;" but, in addition to the preceding, we have politico-economical discussions, and opinions are stated and views advocated respecting which there is certainly a considerable difference of opinion. Those who take an interest in statistical researches will readily appreciate Dr. Holland's great industry and zeal, and will find the work to be a valuable addition to their statistical library; it will doubtless also become a standard book of reference for his fellow-townsmen, as it certainly merits to be. There is no want of churches or chapels at Sheffield, there being sitting-room for nearly five elevenths of the population, while not one family in twenty is in the practice of attending either at one or the other.

Art. VII.—*Pathological and Histological Researches on Inflammation of the Nervous Centres.* By John Hughes Bennett, m.d. &c. &c. —*Edinburgh*, 1843. 8vo, pp. 84.

Although this pamphlet comes before the profession as a distinct publication, it is neither a second edition nor a reprint of the series of articles published by the author in the Edinburgh Medical and Surgical Journal, but the articles themselves in a collected form, and printed from the types already set up, with the addition of a title-page. We think it necessary to state so much, for the benefit of those of our readers who have access to the volumes of our contemporary.

These articles consist of a series of cases of cerebral and spinal disease,

with a detail of the morbid changes, as they appeared to the eye with and without the microscope; plates exhibiting the microscopic changes are given.

The essay is very creditable to Dr. Bennett, whose principal conclusions are the following: Two kinds of cerebral and spinal softening exist, an inflammatory and a non-inflammatory, which may always be distinguished from each other by means of the microscope; the former being characterized by the presence of exudation-corpuscles, and granules, and essentially consisting in the formation and development of nucleated cells in the liquor sanguinis effused from the vessels and acting as a *blastema.* As these cells become developed, they burst, and render the exudation soft, pultaceous, or even diffluent. On the other hand, non-inflammatory softening is the result of a mechanical disintegration of the nervous tissue, either from maceration in serum, by hemorrhagic extravasation, putrefaction, or mechanical violence, and it differs from the preceding in not causing any symptoms, being, in fact, a *post-mortem* appearance. It is, however, impossible to distinguish the two with any certainty by the unaided eye. As respects colour, the fawn-coloured is most commonly inflammatory; the red usually depends on congestion or extravasated blood; the yellow on the colouring matter of the blood; the fawn or gray-coloured on the presence of brown exudation-corpuscles. Maceration in serum causes a white softening, but the presence or infiltration of pus has never been detected as a cause of this morbid change. As respects the symptoms, contraction in one or more limbs is a common symptom of idiopathic softening of the brain. Inflammation of the central parts of the brain generally produce well-marked lesions of sensation and motion, whilst in inflammation of the peripheral portions, lesions of intelligence are commonly exhibited.

Art. VIII.—*Medicines, their Uses and Mode of Administration; including a complete Conspectus of the three British Pharmacopœias, an Account of all the New Remedies, and an Appendix of Formulæ.* By J. Moore Neligan, m.d., Physician to the Jervis-street Hospital, &c. *Dublin,* 1844. 8vo, pp. 432.

This is but an imperfect dispensatory, a critical analysis of which would neither interest nor instruct our readers. In the first place we find a table of contents extending to above twenty-six pages, followed by a most meager description of the numerous substances comprised in it; then comes an imperfect appendix of formulæ, with a posological table: and lastly an index of three or four thousand proper names. An idle pupil, more inclined to trifling amusement than sober study, might perhaps be drilled into habits of perseverance by inflicting upon him such a compilation as this as a task; but we do not understand how the patience of a learned doctor, an hospital physician, and a teacher of therapeutics, could hold out to the last. Still less obvious is it, with the works of Thomson, Paris, Pereira, Merat and De Lens, and Barbier, and various productions under the title of "a complete conspectus" before him, what could induce the author to send the work to press? It is a literary superfluity; and we cannot but think that Dr. Neligan would have done himself and his profession a better service had he illustrated one article of the Materia Medica by original observations and experiments, instead

of spending his time on such a compilation. It is, however, but justice to the author to say that his book, although not wanted, will be found very useful to the student. The articles of the materia medica are arranged in it according to their mode of action.

Art. IX.—*An Anatomical Description of the Human Gravid Uterus and its contents. By the late W. Hunter,* M.D. &c. Second Edition. By E. Rigby, M.D. &c.—*London,* 1843. 8vo, pp. 76. Eight Plates.

This is a seasonable republication of a classical work that had become very scarce; and the profession is under an obligation to Dr. Rigby for having undertaken the task of reediting it. The plan of the present publication is precisely such as we think most proper in like cases. The original work is reprinted, and only such notes—few in number—added as seemed to the editor absolutely necessary to the clearness or just appreciation of the author's statements at the present time. In one of his notes to the section on the Nerves of the Uterus, the editor, whilst acknowledging, in strong terms, the claims of Dr. Lee as an anatomical inquirer, in our opinion falls short of doing full justice to this physician's merits as regards his researches on the nerves of the gravid uterus. Surely, after the publication of Dr. Lee's work on the subject, Dr. Rigby ought not to have stated that Dr. Hunter's treatise "still contains the chief, if not all, of what we yet know for certain about the nerves of the gravid uterus." But as we have already noticed this subject, we shall not further refer to it on the present occasion. Taken as a whole, Dr. Rigby's notes are excellent; and he has creditably discharged his task as editor. In looking over the text we have observed several errors of the press which a vigilant printer ought to have avoided; but these detract, in no respect, from the sterling merit of the work, which we recommend to the attention of every anatomist, and every practitioner of midwifery.

Art. X.—*The Principles of Physiology applied to the Preservation of Health, and to the Improvement of Physical and Mental Education.* By Andrew Combe, M.D. &c. With Fifteen Woodcuts. Twelfth Edition, revised and enlarged.—*Edinburgh,* 1843. Royal 8vo, Double columns, pp. 108.

On more than one occasion in this Journal, we have noticed and eulogised the admirable work, now again before us in a new edition and in an altered form. We believe that no medical work ever published, has exerted a more favorable influence, in a hygienic point of view, than this; and it affords us unmixed satisfaction to see that its truly excellent author has been able, under the pressure of prolonged sickness, to present it once more to the public, in an improved state, and under circumstances that must ensure its perusal by the great body of the reading population of these countries. It is a book truly matchless in its objects, in its plan, and in its execution; and we are certain that those members of our profession, who duly appreciate the great object of all medical science,—the improvement of human health,—can have no greater gratification, and can do few better actions, than using their influence to cause it to be read and studied by their lay friends, high and low, rich and poor. The sale of the former editions has been enormous both in this country and America; and when we consider that the present en-

larged edition is sold at one third the price of the former, viz., *half-a-crown*, it may safely be calculated that the future diffusion of the work will be somewhat proportionate to its easier acquisition. The following extract from the preface commemorates a most important step in the progress of human civilization, which must have attracted the attention of every observant physician.

"Ten years ago, the proposition that physiology should constitute a part of general education, was received by most persons with ridicule or doubt, and by very many with absolute disgust. Of late, on the contrary, opinion has been almost unanimous in its favour, and allusions to the doctrines and usefulness of physiology meet us on every side. In accordance with this, its laws are now frequently referred to by men of philosophic minds, as the standards by which every proposition for the physical, social, or moral improvement of man ought to be tested. This happy change is likely to be progressive, because it has arisen from the gradual diffusion of sounder ideas, and from the preference instinctively felt for useful truths, when once clearly presented to the understanding." (Preface, p. vii.)

Art. XI.—*On the successful Treatment and Prevention of Consumption and Scrofula; Female Disorders connected therewith; Strumous Glandular Swellings, &c.* By J. J. Furnivall, m.d. Second Edition.—*London*, 1844. Small 8vo, pp. 315.

In our Number for April, 1839, we gave an account of this book on its first appearance. As this account was anything but favorable, our readers may wonder how we come to take any further notice of a work which belongs clearly to a class with the writers of which we can have no sympathy,—writers who are either themselves unconsciously deceived through a culpable want of knowledge, or consciously do their best to deceive others by pretending to knowledge which they know they do not possess. To which division of the class Dr. Furnivall belongs, we do not think it worth while to inquire; but we believe the following brief extracts from his new preface will convince all scientific and observant men that we have not classified him wrongly:

"I believe, that if a person apply in time, *deposition of tubercle may be altogether prevented*—that tuberculous deposit, as yet latent, *may be removed by treatment*—and I have notes of cases to prove, that in the second stage, when active congestion or even inflammatory action has taken place around the tuberculous deposit, many a case may, by proper treatment, *be wrested for that time from the grave.*

"The cases which I have attended entitle me to assert, in conclusion, that a proper system of treatment *will be wholly successful, in preventing an attack of consumption, or a recurrence after recovery from a first attack;* and it will be successful, in a great many instances, *where recovery has hitherto been despaired of.*" (Preface, pp. xxii, xxiii, xxiv.)

Our reasons for sacrificing one of our valuable pages for a notice of this poor production, is to exhibit another—and we rather think a novel—aspect of that despicable system of Pseudo-Second-Editions, to which we have before called the attention of our readers. Though Dr. Furnivall's book has all the external characters of a new edition, a new title and titlepage, a new cover, a new preface grandly designated "Prolegomena to Second Edition," and though he boldly tells us that "considerable alterations have been made in the body of the text," the volume before us is, in fact, the identical volume published five years ago, the self-same sheets printed at Hertford in 1838, with merely the alterations already mentioned, and the following very curious changes, to enable the author

to keep the word of promise to the ear, but break to the hopes. First we have the "Prolegomena" of six pages, which is new; secondly, we have a reprint of eight pages, (pp. 13-22,) containing a little new matter; thirdly, another half-sheet, (pp. 59-66,) also reprinted; fourthly, we have the reprint of a whole sheet, (pp. 151-168,) also containing a little new matter; and, lastly we have in place of the "conclusion" of the original publication, which is cancelled, five pages substituted, with the enigmatical title of "Summary for Second Edition." Every other page, line, and word in the volume, (which be it remembered extends to 315 pages,) are, as already stated, the identical matter and substance of the old book. And this is what a member of an honorable profession, an "M.D. of the Royal College of Physicians, London," unblushingly calls a Second Edition!

The counterfeit, it must be owned, is on the whole marvellously well executed; and we suspect that few but such cunning old bookwrights as ourselves will detect it: yet, like all shams, there are some incongruities in the fabrication which will reveal its nature to the initiated. Thus, though great pains have evidently been taken to match the new paper with the old, a practised eye will easily discern the difference between them. Again, the old "Table of Contents," retained, doubtless, on an economical principle, true to its original function, still boldly points, in capitals, to p. 318 for "*Conclusion*," when, alas, the *new edition* has its veritable and *bonâ-fide conclusion* at p. 315! There is no p. 318 except in the deserted storerooms of the Hertford printing office!

Art. XII.—*Illustrations of the Theory and Practice of Ventilation, with remarks on warming, exclusive lighting, and the communication of sound.* By D. B. Reid, m.d. f.r.s.e.—*London*, 1844. 8vo, pp. 451.

The eminent chemist who is the author of this book has been so long known to scientific men by his writings and lectures, and by the reputation he has acquired in applying his knowledge practically to the warming and ventilation of many public buildings—more particularly the Houses of Parliament—that the mere announcement of the work is sufficient to ensure its wide circulation. We deem it our duty, nevertheless, to call the special attention of our readers to it: firstly, because it contains much information which cannot fail to be of great use to them in their daily intercourse with the sick; and, secondly, because their acquaintance with its multifarious matter may enable them to be of much service to the community where they reside, by teaching them how to counteract the proceedings of architects and others who, from ignorance of the principles of ventilation and warming, are so constantly committing most injurious blunders in the construction of public and private buildings. No one will read Dr. Reid's volume without being convinced of the vast importance of the subjects of which it treats to the welfare of the public at large, and without acknowledging the debt which society owes to the author for communicating the information so unreservedly, and in a manner so clear and circumstantial as to render it practically available in everybody's hands. Everything is stated in the simplest and most precise form, and every single statement is illustrated by one or more diagrams. In no work, indeed, did we ever see such a profusion of pictorial aids to the understanding of the text; there being, we should think, many more woodcuts than there are pages in the work.

PART THIRD.

Original Reports and Memoirs.

REPORT ON THE PROGRESS OF PRACTICAL MEDICINE

IN THE DEPARTMENTS OF

MIDWIFERY AND THE DISEASES OF WOMEN AND CHILDREN

During the Years 1842-3.

By Charles West, M.D.,
Member of the Royal College of Physicians, Physician to the Royal Infirmary for Children, and Physician-Accoucheur to the Finsbury Dispensary.

The period included in this Report extends from the first day of October, 1842, to the last of December, 1843. The Report does not profess to furnish a complete index to all that has been written on the general subjects of which it treats during that period; but only to exhibit such facts as are either new, or as furnish new and important illustrations of what was already known, or as serve to confirm the propriety of old modes of practice. It affords no space for elaborate criticism; hence some works, which though of great merit, are occupied rather with the clearer exposition of well-known facts than with the adding to their number, are necessarily passed over without mention. The character of this Report being almost entirely practical, the reader is referred to Mr. Paget's Report in the January number of this Journal, for information on points of Anatomy and Physiology.

The subjects treated of naturally fall under the three heads—Midwifery—The Diseases of Women—and The Diseases of Children,—the minuter subdivisions adopted will, it is hoped, be found convenient.

I. ON THE PROGRESS OF MIDWIFERY.

PREGNANCY.

Signs of pregnancy. The changes in the condition of the os and cervix uteri during pregnancy have been investigated by MM. Filugelli,* Chailly,† and Cazeaux.‡ The results they have arrived at agree on the whole with those of Birnbaum.§ M. Filugelli, indeed, appears to have fallen into the error of imagining that the cervix uteri becomes actually elongated in the course of pregnancy; and M. Chailly's paper is principally occupied with the refutation of this opinion; the slight enlargement which may possibly result from tumefaction of the cervix at an early period of pregnancy being in his opinion too slight to be appreciated. M. Cazeaux's conclusions are: 1. That a softening of the texture of the cervix uteri takes place from the very beginning of pregnancy, being for the first few months confined to its lower part, but extending from below upwards, and taking place less rapidly and in a less marked degree in primiparæ than in those who have already borne children. 2. While this softening goes on, the cervix dilates; presenting in those who have had children the form of a funnel with its base downwards, while in primiparæ it is more spindle-shaped. 3. The os uteri is closed in primiparæ until the end of pregnancy; in women who have borne children it is widely open, forming the base of

* Revue Médicale, Nov. 1842. † Annales de la Chirurgie, Jan. 1843. ‡ Ib., Mai 1843.
§ See a notice of Birnbaum's work on the Changes of the Cervix Uteri in Pregnancy in No. XXXI of this Journal.

the funnel. 4. As a general rule, no real shortening of the cervix takes place until about the last fortnight of utero-gestation.

Disorders of pregnancy. M. Chailly,* in a paper on *watery discharge from the vagina during pregnancy,* adopts the opinion of Naegele, that the fluid is secreted by the uterus, and not in any way derived from the ovum. The fluid, as it is accumulated, detaches the membranes from the walls of the uterus, and a pouch is thus formed in which it is contained until reaction of the uterus is excited. The contractions of the uterus, however, detach the membranes partially from the cervix; and the fluid escapes in gushes through this aperture, an occurrence that is sometimes painless, sometimes attended with pain about the loins and pelvis. Several cases are related to prove that the uterus, and not the ovum, is the source of this fluid. Thus, a woman in the eighth month of pregnancy suddenly discharged two quarts of reddish fluid from the vagina; and though no sign whatever existed of commencing labour, a similar discharge continued for six days. At the full period labour came on, and it was found necessary to rupture the membranes artificially, when a large quantity of perfectly limpid liquor amnii escaped.

Dr. Cortilhes† calls attention to the frequent complication of pregnancy with *ulceration of the cervix uteri.* These ulcerations are frequently caused by the previous occurrence of abortion, and in many instances exist before the commencement of pregnancy. The symptoms to which they give rise, however, may be so slight as not to attract notice while the patient is unimpregnated, though on the occurrence of pregnancy they generally become very marked; while utero-gestation renders the ulcers very indisposed to heal, or even prevents their cicatrization. The ulcerations are always associated with engorgement of the cervix uteri, which is more considerable in the early months of pregnancy, than at a later period, and they invariably give rise to pain in the lower part of the abdomen. They are usually of an irregularly circular form, four or five lines in diameter, and one or two deep, and have a fungous surface covered with dark red, almost violet-coloured granulations. The ulceration usually begins around the edge of the os uteri and thence extends, giving rise to a thick, yellowish white discharge. Should the disease occur in the earlier months of pregnancy, the ulcerations will often advance, though very slowly, towards cicatrization, and utero-gestation continues undisturbed. When the ulceration supervenes at a later period, no attempt is made at cicatrization, and premature labour comes on unless the woman be subjected to proper treatment. This tendency of the disease to induce premature labour constitutes its gravity; but M. Cortilhes regards it as very amenable to treatment which consists in the local employment of caustics and the use of astringent injections.

Two cases of fatal *hemorrhage* at the end of pregnancy *from the bursting of a varix,* in one instance in the left labium, in the other in the left thigh, are recorded by Dr. Hesse and Dr. Hiller.‡

Extra-uterine pregnancy. Of this, many cases have been recorded; they do not, however, illustrate any new point, while the anatomical details of almost all are extremely imperfect. It may nevertheless be useful to refer to them. A case of *interstitial* pregnancy, in which the ovum was situated near the orifice of the left fallopian tube, and which terminated fatally about the third or fourth month, is related by M. Payan.§ Cases of *abdominal* pregnancy are related by Löscher, Hirtz, Nicolai, Lorinser, Wilson, Pohl, and Hauck.‖ The patient in Dr. Löscher's case survived eleven years, during the first six of which she was tolerably free from suffering, but afterwards endured much from extreme tenderness of the abdomen, and from attacks of pain, and the formation of a tumour in the right iliac region. She died quite worn out, when the fœtus was found converted into a hard mass, in which was no trace either of placenta or cord. It lay free in the abdominal cavity, and was connected with the viscera only by a few adhesions. The tumour in the iliac region had been

* Bull. Gén. de Thérapeutique, Dec. 1842. † Clinique des Hôp. des Enfans, Sept. 1843.

‡ Medicinische Zeitung, Nov. 30, 1842. § Bull. de l'Acad. Royale de Médecine, Oct. 1843.

‖ Neue Zeitschr. f. Geburtskunde, xiii Band, S. 390. Bull. Gén. de Thérap. Mars 1843. Med. Zeitung, June 7, 1843. Oesterr. med. Wochenschr., Feb. 11, 1843. Lond. and Ed. Monthly Journal, Nov. 1843. Oesterr. med. Wochenschr., June 10, 1843. Casper's Wochenschr., Nov. 18, 1843.

formed by the ovaries, both of which were diseased. The fœtus in Dr. Wilson's case sojourned for thirty-seven years in the mother's abdomen, without causing inconvenience. She gave birth to a living child eighteen months after her spurious labour with the extra-uterine child, and died of dropsy at the age of 75. Dr. Pohl's patient recovered perfectly after the lapse of two years, having discharged the bones of the fœtus partly through an aperture in the vagina; partly through the abdominal integuments. Rose, Watson, Creutzer, and Lindsay* have detailed cases of *fallopian* pregnancy; and Lehwess and Griscom† of *ovarian* pregnancy.

LABOUR.

Preternatural labour. From causes depending on the mother. In a series of papers by Dr. R. Knox, of Edinburgh, are some interesting remarks on the *Pelvis.*‡ He notices the difference in form between the fœtal pelvis and that of the adult female, and endeavours to show that many malformations of the pelvis are the result of arrested development. The fœtal pelvis is of a quadrilateral rather than an oval or rounded form, and its longest diameter is the antero-posterior; in which respect as well as in its general contour, it presents an approximation to the pelvis of the quadruped. The progress of development impresses on it the peculiarities distinctive of the human being, but the fœtal form persists to a certain extent in the pelvis of the male, and its accidental continuance constitutes one variety of malformation of the female pelvis. Female pelves, in which this malformation exists, are characterized by the sides being too straight, the sacrum too narrow, the transverse diameter of the brim too short, and the antero-posterior diameter too long. This arrest of development, however, may affect one side only, and may exist in various degrees. It may either be very slight, or much exaggerated, and in this case may implicate not the form only, but also the size of the bones; which on one side may be positively smaller than on the opposite side. When this deformity exists in any considerable degree, the *pelvis oblique ovata* of Naegele is produced. In illustration of this opinion, he describes three pelves in which this deformity existed. In one, which was the pelvis of a young person, the sacro-iliac synchondrosis was not ossified, although the deformity of the right side was very marked, and exactly such as Naegele has described. In another pelvis too the anchylosis of the sacro-iliac synchondrosis was quite superficial, and did not extend the whole depth of the joint. From these facts he concludes, that anchylosis of the junction between the sacrum and ilium is by no means necessarily connected with this deformity of the pelvis, though it usually follows as a consequence of the arrest of development. [This, indeed, might have been thought probable before, but until the case described by Dr. Knox, no instance was on record in which the obliquely-deformed pelvis had been found unassociated with anchylosis of the sacro-iliac synchondrosis.] In further confirmation of his theory as to the nature of this deformity, Dr. Knox alludes to a pelvis in the possession of Professor v. d'Outrepont, in which this arrest of development existed on both sides. The resemblance it presents to the early form of the fœtal pelvis is very striking, and scarcely less so is its similarity to the pelvis of some of the mammalia, as for instance, the seal; and its whole form affords a remarkable example of the predominance of the law of general type over that which determines the peculiarities of the species. [Dr. Knox speaks of this pelvis of v. d'Outrepont merely from hearsay, but the very elaborate description of it by Dr. Robert,§ and the drawings by which the description is illustrated fully confirm his opinion. Naegele and, after him, nearly all writers on the subject, agree in regarding this form of pelvis as the result of congenital malformation. They conceive, however, that the anchylosis is congenital as well as the malformation of the bones, and by so doing obscure the question of the mode in which this deformity is produced. Dr. Knox has shown that the two are not consentaneous in their occurrence;

* Guy's Hospital Reports, Oct. 1843, p. 488. Edinburgh Med. and Surg. Journal, Oct. 1843, p. 369. Oest. med. Wochenschr., Sept. 2, 1843. Boston Med. and Surg. Journal, August 9, 1843.

† Casper's Wochenschr., Dec. 10, 1842. New York Journal of Medicine, July 1843.

‡ London Medical Gazette, July 14-21-28, 1843.

§ Beschreibung eines im höchsten Grade querverengten Beckens, etc., von Dr. F. Robert; Carlsruhe 1842, Folio.

and to him is due the credit of having been the first to explain the real nature of this malformation, to show that it is not a mere "lusus naturæ" and to elucidate the laws in obedience to which it is produced.]

Dr. Spengel*, in a dissertation written under the auspices of Professor Naegele, describes two cases, neither of which, however, came under his own observation, in which the *pelvis deformed by osteomalacia* yielded so as to admit the passage of the child during labour.

Dr. Ashwell† has made some valuable practical remarks on *Occlusion and rigidity of the Cervix Uteri* as an impediment to labour, and has related cases illustrative of his views. He dissents from the opinion of those who imagine that in many instances of alleged closure of the os uteri, the practitioner was deceived by an unusual degree of obliquity of the uterus placing its orifice out of reach; and states that he has never met with any case in which labour was seriously protracted by obliquity of the womb. He advocates the early employment of mechanical means to reopen the occluded os, and thinks that, unless its situation be clearly indicated by some marked depression and thinning in the uterine wall, incision is far preferable to any attempt at forcing a passage by the use of a catheter, the finger, &c. He regards the hazard of extensive laceration of the womb following such incisions as an imaginary danger; and therefore in cases where though the os uteri is not occluded, both it and the cervix are rigid and undilatable, and continue so after the employment of venesection, and the administration of antimony and opium, he conceives incision to be far preferable to any attempt at artificial dilatation.

Malposition of the uterus, as an impediment to labour. Dr. Perfetti‡ attended a woman in labour, who had complete procidentia of the uterus. She had suffered more or less from prolapsus uteri ever since she was 15 years old, and on any great exertion the organ appeared externally. Having become pregnant at the age of 22 she was relieved from her ailment until the 7th month of utero-gestation, when it began to return; at the beginning of the 8th month the uterus reached more than six fingers' breadth beyond the external parts, and during labour it projected still further. After being four days in labour, Dr. Perfetti visited her, and found the os uteri so hard and undilatable as to require incisions to be made into it. He then introduced the forceps into the uterus, and extracted the child. The mother recovered, but the prolapsus of the uterus rendered it necessary for her to wear a pessary. Dr. J. Ledesma,§ of Salamanca, has recorded the history of a woman, aged 42, the mother of six children, who was affected with inguinal hernia on the right side. In the 3d month of her 7th pregnancy the hernial swelling suddenly increased in size; and continued progressively to enlarge up to the period of labour, utero-gestation being undisturbed by this accident. When labour began, the hernial tumour measured 24 inches in length, and 26 in circumference at its broadest part; its base reached to the crural arch, and its weight had drawn the right labium considerably downwards. When labour-pains came on, which were attended with a slight discharge of liquor amnii from the vagina, an incision was made into the tumour, and a living female child, 22 inches in length, was extracted. The patient would not submit to the division of the adhesions by which the uterus was confined to its abnormal position, and consequently the hernia was not reduced. In 40 days from the date of the operation the patient was sufficiently well to attend to her household duties. [This case is very similar to that which recently occurred to Dr. Fischer, of Berne, mention of which is found in many of the English journals, except that Dr. Fischer's patient died. References to other similar cases will be found in Busch, Geschlechtsleben des Weibes, iii Band, Seite 647.]

Rupture of the uterus, and laceration of the vagina and perineum. The note‖

* Dissertatio sistens dilatationem pelvis ex osteomalacia coarctatæ in partubus observatam; Heidelb, 1842.

† On the Diseases of Women, Part ii, p. 444.

‡ Bulletino delle Scienze Mediche di Bologno, Aprile 1843

§ Jornal da Sociedade das Sciencias Medicas di Lisboa, t. x, and Oppenheim's Zeitschr., Dec. 1842.

‖ Professor Hayn, Casper's Wochenschr., Dec. 31, 1842. Dr. Plath, Oppenheim's Zeitschr., Feb. 1843. Dr. Malcolm, Lond. and Edinb. Monthly Journal, Oct. 1843. Dr. Giese, Casper's Wochenschr., Oct. 7, 1843. Dr. Bowen, Amer. Journ. of Med. Science, Oct. 1843. Sankey, Med. Gazette, Sept. 8, 1843; case of laceration of the vagina.

contains references to cases of ruptured uterus, which presented the symptoms that usually attend that accident, and which terminated fatally more or less speedily after its occurrence. The fatal case of Dr. Giese was associated with putrescence of the uterus, and Dr. Bowen's patient having twice before undergone the Cæsarean section, the uterus gave way in the situation of the cicatrix. Besides these cases, four others are recorded, in which the patient recovered * Dr. Mitchell's patient was 38 years old, and the mother of 6 children. From the 6th month of pregnancy she had suffered very severe pain at the lower part of the abdomen. Labour proceeded favorably for the first 12 hours, when sudden collapse and vomiting occurred. The patient was delivered by the crotchet, and it was then found that a rupture existed at the anterior part of the cervix uteri. Extreme irritability of the stomach, and very intractable diarrhœa were the most prominent symptoms that followed her delivery. Opium was given in large and frequently repeated doses, both by the mouth, and in enemata, and on the 31st day after her delivery she was sufficiently recovered to be removed to her own home. M. Castelly performed gastrotomy on his patient three hours after the rupture of the uterus had occurred, and extracted the placenta, as well as the child, through the wound. Severe metro-peritonitis followed the operation, but the patient ultimately recovered. Six months afterwards she menstruated; and nine months afterwards aborted at the third month. The accident to Dr. Vaulpré's patient appears to have been produced by repeated unsuccessful attempts to deliver with the long forceps. Dr. Van Cauwenberge's patient had undergone the Cæsarean section 14 months before. When in the 7th month of pregnancy labour-pains came on; symptoms of ruptured uterus occurred, and the child passed into the abdominal cavity. The exhausted condition of the woman appeared to forbid all interference, but between the 15th and 20th day after the accident happened the cicatrix of the abdominal integuments gave way, and a putrefied fœtus, with its appendages, was extruded. M. Danyau† recommends that the suture should be applied in cases of laceration of the perineum, immediately on the occurrence of the accident, instead of waiting till the patient has recovered from her labour, when it would be necessary to refresh the edges of the wound before applying the suture. The authority of M. Roux is directly opposed to M. Danyau's plan; but M. Danyau asserts that the degree of tumefaction which follows a rent of the perineum has been exaggerated, whilst the suture tends to diminish it, and if proper attention be paid to the introduction of the catheter, and the frequent use of vaginal injections, neither the lochiæ nor the urine will seriously interfere with the healing of the wound. On the other hand, if the operation be delayed, it becomes almost impossible to bring the edges of the wound into contact. In support of his opinion he relates six cases; in five of which the perineum was torn up to, but not into the sphincter, and the operation was successful; in the sixth the sphincter too was involved, and there was considerable ecchymosis about the edges of the wound. The operation, in this instance, failed, sloughing of the parts having taken place on the fourth day after delivery.

Preternatural labour. From causes depending on the child. M. Géry relates‡ the case of a woman, in whom *arm presentation* occurred in nine successive labours; her first child having presented naturally; her second by the feet; and the remaining nine having been cross-births References are given in the note§ to cases of spontaneous evolution, which, do not however, add anything to our knowledge of the process as explained by Dr. Douglas. Dr. Hüter, of Marburg, has written a lengthy paper,|| in which he recommends turning to be practised without rupturing the membranes, in some cases of arm presentation. The operation is much the same as

* Dr. Mitchell, Dublin Journal of Med. Science, Jan. 1843. M. Castelly, Bull. de l'Acad. Roy. de Méd. Sept. 30, 1843. Dr. Vaulpré, Gaz. Méd. Mars 18, 1843. Dr. v. Cauwenberge, L'Expérience, Nov. 18, 1843. † Journal de Chirurgie, Juin 1843. ‡ Revue Médicale, Nov. 1842.

§ v. Hammer, Neue Zeitsch. f. Geburtsk. xiii Band, S. 75. Corbyn, India Journal of Med. Science, Dec. 1842, relates two cases. Hinterberger, Oest. med. Wochenschr., March 25, April 1, 8, 1843, relates seven cases, in two of which there were twins, and the evolution took place with the second child. Two children were born alive, but died soon after birth; one of these was a twin, the other was not, and the mother had reached the full term of utero-gestation. Huguier, Gaz. des Hôp., Août 24, 1843.

|| Neue Zeitsch. f. Geburtsk., xiv Band, S. 1.

that practised by Michaelis, when prolapsus of the cord occurs, and consists in the introduction of the hand between the uterus and the membranes, until the operator reaches the feet, knee, or other part, when, without rupturing the membranes, it will be extremely easy to turn the child. He practised this manœuvre in five cases, but in three the same person was the subject of the operation. In four of the five cases the child was saved, and in one instance the mother had previously lost two children by the ordinary mode of turning. He recommends this practice as disturbing the ordinary course of labour much less than the usual mode of turning, since the rupture of the membranes is left to nature, and the case may be afterwards managed, as if the presentation had been natural from the beginning. The whole quantity of the liquor amnii being available in this operation, its performance is greatly simplified, while it has the further advantage of avoiding the prolapse of the cord, or of admitting of its reposition, should that accident have occurred. He denies that the uterus would be much irritated by this proceeding, and asserts that the membranes would be stretched, and forcibly separated from the uterus, or the placenta partially detached, only, if the operation were attempted before the os uteri is sufficiently dilated, or if the membranes were morbidly adherent, while auscultation would always be an adequate guide to the situation of the placenta. [These arguments do not appear by any means conclusive; the various favorable circumstances which, according to Dr. Hüter, warrant the operation, are not found often to coincide, and the hazard of detaching the placenta is probably much greater than he represents it to be. His assertion, too, that auscultation would invariably guide to the situation of the placenta is incorrect, for in 180 out of 600 cases, in which it was resorted to by Naegele,* or in 30 per cent., it was not possible to determine the seat of the placenta.]

A descendant of the famous Saxtorph has published a dissertation† on *Prolapsus of the cord*, which, without containing anything new, is a very valuable summary of the present state of knowledge, and obstetric practice in such cases.

Instances in which labour was impeded by *malformation of the fœtus* are related by M. Bouchacourt,‡ and Dr. Porter.§ In the former case the abdomen of the fœtus was enormously enlarged by hydatids of the kidneys, and delivery could not be accomplished until after its evisceration; in the latter the obstacle arose from an enormous spina bifida occupying the sacrum.

Preternatural labour. From abnormal condition of the ovum. A case of Partus siccus is detailed by M. Matthysen,‖ in which the patient was delivered of her first child after a quick labour, but in which no discharge of liquor amnii either preceded or followed its birth. The placenta came away naturally, the uterus contracted well, and though the lochiæ were exceedingly scanty, no accident occurred in the puerperal state. The child was born alive, full grown, but extremely thin, and its skin was covered by a thick coating of vernix caseosa. [M. Matthysen erroneously supposes this to be the only case of the kind on record; instead of which many cases have been related since attention was first called to it by Rudolphi.¶]

Operative midwifery. MM. Pereira and Lasserre,** formerly *internes* at the Maternité, have published an essay on the abuse of various obstetric manœuvres, the accidents to which they give rise, and the advantages of temporising in the practice of midwifery. Many cases are related, illustrative of the evil consequences of forcible dilatation of the cervix uteri, and of the application of the forceps, with no other indication than the slowness of the labour. In this last category there are related several cases of laceration of the vagina, and rupture of the uterus, and the remarks of the writers on these accidents form the most valuable part of the paper. They next endeavour to show, by the evidence of statistics, that the danger to the mother's life, from the mere prolongation of labour, is less than the danger to which she is exposed when the labour is terminated by manual or instrumental interference.

* On Obstetric Auscultation, West's translation, p. 80.

† De Prolapsu Funiculi Umbilicalis; Havniæ, 1842. See also, for a review of it, Br. and For. Med. Review, April, 1843.

‡ Bull. Gén. de Thérapeutique, tome xxiii, p. 473.

§ American Journal of Med. Science, April 1843.

‖ Annales d'Obstetrique, Janvier 1843.

¶ De Partu Sicco; Erlangæ, 1790.

** Archives Gén. de Med., Janvier et Fevr. 1843.

Craniotomy. Dr. Smith,* of Glasgow, has invented a new perforator; the blades of which expand, by means of a screw, much in the same way as the blades are separated in Weiss's speculum. He conceives that by this modification some of the dangers incidental to the employment of the ordinary perforator are avoided. Various attempts have been made to improve Baudelocque's cephalotribe:† many of these devices display much ingenuity, but at the same time add greatly to the complication of this formidable and, it may perhaps be added, useless and dangerous instrument.

The Cæsarean section. The note‡ contains references to various cases of this operation [which with those collected by Kayser, make a total of 349, of which 131 terminated favorably for the mother; while in 218, her life was sacrificed.] There are besides, two other cases that occurred within this period, in which the operation was performed, after the death of the mother, and in one case, that of Dr. Loweg, the child's life was preserved.§

Uterine hemorrhage. Dr. Lever‖ calls the attention of the profession to the peculiar tendency to uterine hemorrhage induced by disease of the spleen and by granular degeneration of the kidney. He relates three cases of disease of the spleen in which uterine hemorrhage came on immediately after delivery, and mentions having met with others of a similar kind. From these he concludes that in persons affected with disease of the spleen there is a peculiar tendency on the part of the uterus to dilate, and thus to admit of internal hemorrhage. The coagulated blood, too, retained in the uterus gives rise to considerable irritation, marked by rigors, fever, &c.; the fever being very apt to assume the intermittent type, especially in persons who have once suffered from ague, and is cured by the same remedies as other intermittents. Two cases of hemorrhage in persons affected with Bright's kidney are related; puerperal peritonitis subsequently came on, and the patients died. v. D'Outrepont¶ recommends the employment of a strong solution of chloride of iron, as a styptic in cases of uterine hemorrhage. He injects an ounce of a saturated solution of the salt into the vagina, and in a case of placenta presentation the plug which he employed was dipped in this solution.

THE PUERPERAL STATE.

Puerperal convulsions. Dr. Johns,** assistant at the Dublin Lying-in Hospital, calls attention to the fact that puerperal convulsions never occur in labour without premonitory symptoms having existed during pregnancy. The most frequent symptoms are swelling, not limited to the lower extremities, but involving the hands, arms, neck, and face. If besides there be headach, sense of weight or giddiness in the head, ringing in the ears, a temporary loss of vision, or severe pain in the stomach with flushings of the face, the risk of convulsions is considerable. This risk amounts to almost absolute certainty if the woman be pregnant for the first time, or have suffered similarly in former pregnancies, if she be full and plethoric, and if the presentation of the child should be a natural one. He gives full statistical details to show the liability of primiparæ to convulsions, and also to prove the more frequent occurrence of convulsions in cases where the presentation is natural. Dr. Lever†† notices the frequent connexion of an albuminous state of the urine, with puerperal convulsions, and suggests that congestion of the kidney from pressure of the gravid uterus on the renal veins is its probable cause. He grounds his opinion on the circum-

* London and Edinburgh Monthly Journal, Nov. 1842.

† Finizio, Annales d'Obstetr., Nov. 1843. v. Huevel, Ibid., Oct. 1843. Chailly, Bull. Gén. de Thér., Fevr. 1843. Caseaux, Annales de la Chirurgie, April 1843. Langheinrich, Neue Zeitschr. f. Geburtsk., xv Band, S. 110.

‡ Cases in which both mother and child were saved: Ringens, Med. Zeitung, Nov. 28, 1842 Monin, L'Expérience, 6 Avril, 1843. Schacht, Casper's Wochenschr., May 13, 1843. Berndt, Neue Zeitschr. f. Geburtsk., xiv Band, S. 335. Cases in which the child only was saved: v. D'Outrepont, Neue Zeitschr. f. Geburtsk., xiii Band, S. 431. Dr. C. Falconer, Amer. Journal of Med. Science, July 1843. Cases in which neither mother nor child was saved: Wraith, Prov. Med. Journal, Jan. 21, 1843. Hooper, Lancet, Feb. 4, 1843.

§ Lorinser, Oester. med. Wochenschr., Jan. 1, 1843. Loweg, Casper's Wochenschr., Dec. 2, 1843.

‖ Guy's Hosp. Reports, Oct. 1842, p. 325.

¶ Neue Zeitschr. f. Geburtsk., xiii Band, S. 322.

** Dublin Med. Journal, Sept. 1843.

†† Guy's Hospital Reports, Oct. 1843.

stance that in nine out of ten cases of puerperal convulsions in which the urine was examined, it was found to contain albumen; a condition which is shown not to be generally incidental to parturient women by the fact, that the urine of fifty women in labour was examined without a trace of albumen being discovered, except in one or two who had shown premonitory symptoms of convulsions. To this albuminous state of the urine he is disposed to refer the œdema of the face and extremities, which has been noticed by various writers as premonitory of puerperal convulsions, and indicating the employment of most active antiphlogistic measures. A similar opinion has been expressed by Dr. Simpson,* who states that for the past two years he has been accustomed to teach his class "that patients attacked with puerperal convulsions had almost invariably albuminous urine, and some accompanying or rather preceding dropsical complication, and hence, probably, renal disease;" and in one instance he had the opportunity of confirming this supposition by a post-mortem examination. Somewhat connected with these inquiries is the paper of M. Lasserre† on metastatic serous congestions in women recently delivered. He notices the œdema of the extremities which often exists in pregnant women, owing in part to, what he terms, a serous diathesis; but still more to the mechanical obstacle to the return of blood from the lower parts, caused by the pressure of the gravid uterus. After delivery, this obstacle is removed and the œdema disappears, often very rapidly. When the œdema has been very considerable, and its subsequent removal rapid, the sudden introduction of a large quantity of serum into the circulation gives rise to a true serous plethora, which is characterized by a full and hard pulse, and considerable constitutional disturbance. In most cases the absorption of serum does not go on very rapidly until after the secretion of milk has been established: and the latter function seems to counteract any tendency to constitutional disturbance which the former process may have given rise to, or arrests it before it becomes serious. He relates instances to illustrate this; in one of which cerebral symptoms subsided so soon as a copious secretion of milk was established, while at the same time the urine became albuminous and greatly increased in quantity.

Should the œdema disappear very rapidly without milk being abundantly secreted, various accidents may occur, which generally assume a grave character about the third day after delivery, though they appear earlier in a slight degree. The first symptoms are a return of the œdema about the face and eyelids, and a general hebetude of the senses. Respiration is often slightly laborious, the pulse is large, full, and hard, and the cellular tissue of the extremities becomes œdematous. The lochiæ continue abundant, and soon after delivery grow very pale and serous. These symptoms may disappear under judicious treatment, or they may be succeeded by a state of coma growing by degrees more and more profound, and by other symptoms resembling serous apoplexy, and proving very speedily fatal. The sinuses in such cases are found gorged with very fluid blood, and an immense quantity of serum is infiltrated into the sub-arachnoid tissue, and contained in the ventricles; and the pleuræ also often contain a large quantity of fluid. Sometimes the lungs, rather than the brain, become the seat of this congestion; urgent dyspnœa occurs, moist râles are heard through the whole of both lungs, and the patient dies with intense bronchitic symptoms within twenty-four hours from the time of their first assuming an alarming character. After death the lungs are found highly œdematous, the bronchi much congested, and the pleuræ full of fluid. Punctures of the infiltrated extremities as a prophylactic measure, and the most vigorous employment of depletion, and evacuants, as antimony and ipecacuanha, whenever serious symptoms come on, constitute the treatment.

Puerperal fever, &c. Reference must be made to the very valuable lectures of Dr. R. Lee,‡ which, however, merely afford a confirmation of opinions expressed in his former work. Nothing, indeed, actually new has appeared on the subject of puerperal fever and uterine inflammation; but Dr. Doherty,§ in a paper on *Chronic*

* London and Edinb. Monthly Journal, Nov. 1843, p. 1015, note.

† Gazette Médicale, Nov. 25 and Dec. 2, 1843.

‡ Published in the Medical Gazette, and since reprinted in one volume.

§ Dublin Journ. of Medical Science, Nov. 1842.

Inflammation of the Uterine Appendages after Parturition, calls attention to a disease which has not been noticed so much as its importance deserves. It is not usually announced by any very severe symptoms; but a woman who, to all appearance, had recovered perfectly from an ordinary labour, is seized, after exposure to cold, days or weeks afterwards, with shivering, febrile symptoms, and a dull sense of weight about the pelvis. Febrile paroxysms recur at intervals; as they grow more frequent, pain and difficulty in moving the leg of the affected side are felt. The patient still walks about, her pulse is rapid but soft, rigors are frequent, pain and difficulty in moving one or both legs are experienced, there is frequent desire to pass water, and tendency to diarrhea. Uneasiness is felt in one or both iliac fossæ where there are fulness and hardness, and tenderness on pressure, especially in the course of Poupart's ligament. Further indications of the disease are discovered on making an internal examination, when the vagina will be found tender, firm, and inelastic, and the uterus bound down more or less completely to the affected side. When the disease has advanced further, the ovary may often be felt externally as a round circumscribed tumour, but it is by examination per rectum that the ovarian tumour will be most certainly distinguished; [a point, by the bye, first insisted on by Loewenhardt, in his remarks on inflammation of the ovary. See Br. and For. Med. Rev., vol. II, p. 527.] A paper by Dr. Churchill* treats of the more chronic form of this affection, and forms a kind of sequel to Dr. Doherty's essay. He illustrates his remarks by the detail of numerous cases, partly original, partly recorded by other writers. He calls attention to the fact, that though considerable local pain, as well as general febrile symptoms are usually present, yet the disease may proceed unattended by either, and the existence of a tumour in the iliac region may be the first sign of its occurrence.

Lactation. Its influence on conception. Dr. Loudon,† in a work on the law of population and subsistence, propounds the theory that the laws of nature require lactation to be prolonged for three years, and expresses an opinion that the antagonism between the uterus and mammæ is so great as usually to prevent conception in women who have infants at the breast. This opinion, however, does not accord with the facts stated by Mr. Roberton, and is even more decidedly at variance with the results arrived at by Dr. Laycock. Dr. Laycock‡ states that 135 married women yielded 209 pregnancies during 766 lactations, or 1 pregnancy in 3·66 lactations, or 27 per cent. These 209 pregnancies occurred in 76 females, that is to say 56 per cent. became pregnant while suckling; but in 30 of these pregnancy under these circumstances occurred only once. If, therefore, they be deducted, there remain 46, or 33·9 per cent., or nearly 1 in 3 who became pregnant on more than one occasion while suckling; and 19 of these, or 1 in 7, had always (after their first pregnancy) conceived while suckling.

Influence of menstruation on lactation. M. Raciborski§ investigated the influence of menstruation on the milk of nurses, and on the health of the infant in seven women who menstruated while suckling. He could discover no other change in the milk at those periods, than that it contained a smaller quantity of cream; and he concludes that the injurious influence of menstruation on the health of the infant has been greatly exaggerated, and that the circumstance of a woman menstruating during lactation is not a sufficient reason for rejecting her as a wet nurse.

Diseases attending Lactation. Dr. Shanks‖ of Memphis in Tennessee, and Dr. Taylor¶ of Monticello in Florida, describe a peculiar form of sore mouth, incidental to suckling women, and which is apparently owing to endemic causes. It comes on in the latter months of pregnancy, alternating with diarrhea, and being attended with great derangement of the digestive powers. It usually ceases for a short time after parturition, but soon returns with increased severity, associated with diarrhea, which sometimes wears out the patient, and thus proves fatal. When the disorder begins, the tongue and whole interior of the mouth become red and raw, and a burning acrid

* Dublin Journal of Medical Science, Sept. 1843.
† Solution du Problème de la Population, etc.; Paris, 1842.
‡ Dublin Med. Press, Oct. 26, 1842.
§ Bull. de l'Acad. Roy. de Méd., Juin 15, 1843.
‖ American Journal of Med. Science, Oct. 1842. ¶ Ibid., Jan. 1843.

saliva is secreted. A state of feverish excitement accompanies this condition in plethoric females, while those of a weaker frame are free from fever. This state alternates with diarrhea, but as has already been mentioned, they both cease for a few weeks after parturition, but then usually return. The diarrhea is almost or altogether painless; the evacuations are copious, thin, and dirt-coloured; or in the more protracted forms ash-coloured; or light, fermented, and frothy. The soreness of the mouth is most distressing, being sometimes so extreme, that any attempt to speak, or to swallow the blandest food produces pain. The secretion of milk continues copious, and the infant thrives for a long time after the disease has become very severe The gradual loss of strength from the continued diarrhea and the general nervous irritation give rise to a fatal issue in the worst cases. If the disease should occur during pregnancy, a generally alterative plan must be adopted, and, sometimes in plethoric persons, depletion must be had recourse to, and a strictly antiphlogistic treatment be pursued. During lactation alteratives must be employed, with a very strict diet; ipecacuanha with or without opium is useful; active purgatives are always bad; but in obstinate cases small doses of arsenic or corrosive sublimate may be employed; and weaning the child sometimes becomes absolutely necessary to the mother's recovery. Dr. Shanks has found an infusion of the sanguinaria canadensis form the best local application for the mouth. He attributes the disease to marsh miasmata, since it never occurs in high and dry districts, and has diminished at Memphis, in proportion as the country has been cleared, and endemic fevers have become less frequent. A form of diarrhea with a somewhat similar affection of the mouth is not unusual among males in the same district; and on this fact, as well as on the nature of the remedies which he has found beneficial, he grounds his opinion as to its cause. Dr. Taylor, however, is inclined to dispute the influence of local causes in its production, since he has met with it in very different situations.

II. ON THE PROGRESS OF KNOWLEDGE WITH REFERENCE TO THE DISEASES OF WOMEN.

DISORDERS OF MENSTRUATION.

Amenorrhea. M. C. Bécasseau* relates a case of amenorrhea, dependent upon *imperforate cervix uteri.* The subject of the observation was a young woman, aged twenty-six, whose health had been good until her twenty-third year; when menstrual molimina came on, attended with hysteria, epilepsy, and hemoptysis, recurring every month. A membrane was found occupying the fundus of the vagina, and completely concealing the cervix uteri. After its division and the exposure of the cervix no trace of the os uteri could be seen beyond a slight depression, but a puncture having been made in that situation, gas escaped mixed with fetid blood, and menstruation afterwards occurred regularly at every period. M. Böhm† details two cases, in which, during convalescence from typhus fever, inflammation of the vagina occurred, followed by purulent discharge, and the separation of the lining membrane of the vagina in a sphacelated state. This was followed by adhesion of the walls of the vagina, and consequent retention of the menses. Operative means were had recourse to: in one case with perfect success; in the other a putrid fever came on five days afterwards, and destroyed the patient.

Menorrhagia. Dr. Stevenson‡ and Dr. Simpson,§ both recommend the gallic acid as a very valuable astringent. Dr. Stevenson gave it in doses of eight grains every three hours; and in three very alarming cases which he relates, the action of the remedy was speedy and satisfactory. Dr. Simpson has found it very useful, though not invariably so, in many extremely obstinate cases. He gave it during the continuance as well as in the intervals of the discharge, in doses of ten to twenty grains in the form of pills, daily; and finds that it has the great advantage over many other antihemorrhagic medicines, that it does not constipate the bowels.

* Gazette des Hôpitaux, Oct. 15, 1842. † Oesterr. med. Wochenschr., Feb. 25, 1843.
‡ Edinburgh Med. and Surgical Journal, July 1843, p. 103.
§ London and Edinburgh Monthly Journal, July 1843, p. 660.

DISEASES OF THE VAGINA.

Vesico-vaginal fistula. M. Lallemand* has published the paper on this subject which was read at the Institute, in August, 1839. He observes, that vesico-vaginal fistula, from any other cause than difficult labour, is of extremely rare occurrence; that even carcinomatous ulceration very seldom gives rise to it. The transverse form which the aperture almost invariably assumes is partly owing to the form of the pubic arch against which the fœtal head presses; but is likewise in part produced by the transverse direction of the folds of the vagina favouring the diminution of the long diameter of the fissure. The proximity of the fissure to the neck of the bladder, or its remoteness from it, has been supposed to modify the degree of discomfort experienced by the patient; but M. Lallemand denies that in this respect there exists any real difference, except between *urethro-* and *vesico-vaginal fistulæ.* The power of retaining much or little urine depends on the size of the fistula, rather than on its situation.

Any attempt at the cure of a fistula is justifiable only in cases where it is not so large but that its edges can, for the most part, be brought into contact; and eighteen lines in its longest diameter is the largest size of any fistula on which M. Lallemand has ever operated with success. In all cases, however, the state of the patient's general health has a great influence on the healing process.

Fistulæ so small as to be closed by the tumefaction of their edges may be healed by cauterization alone, provided a catheter be kept in the bladder; and the same result may often be attained with larger fistulæ by a frequent repetition of the operation. In cases where the cure of fistulæ is attempted by paring their edges and then employing the suture, the distance of the fistula from the entrance of the vagina greatly increases the difficulties of the operation; no such result, however, occurs when the actual cautery or lunar caustic is employed, and the edges of the wound are kept in contact by the *sonde-airigne.* It should, however, be borne in mind, that all operative proceedings are hazardous in the case of fistulæ which are close to the cervix uteri. Fatal peritonitis has been induced in such cases; probably owing to the proximity of the peritoneum at that part where it passes from the uterus to the bladder.

The age of the fistulæ has a great influence on their curability: the older they are, the more difficult are they of cure; and, in no case that terminated successfully, had more than a year elapsed from the time of their occurrence. This, however, does not depend on any increased hardness of the edges of the wound, but results from the deposit on them of the salts of the urine, and from the various circumstances connected therewith, which impair the patient's health. This deposit of the salts of the urine, too, is not only unfavorable in itself, but also inasmuch as it betokens that the irritation has extended from the bladder to the kidneys; and, consequently, that the general condition of the constitution is unfavorable to the reparative process.

M. Lallemand is opposed to the practice of paring the edges of the fistula, and then attempting their reunion by the suture, since the size of the opening is thereby increased without any of that swelling being induced which follows cauterization, and often with so beneficial a result It is his custom to employ cauterizing irons, the stem of which is made as slender as possible, except in cases where the fistula is very minute and sinuous, when he uses the lunar caustic; since irons, sufficiently delicate for the purpose, would not retain their heat. As a means of bringing the edges of the wound into contact after cauterization, he prefers the *sonde-airigne* to any other instrument. This is a female catheter, of large caliber, from the bottom of which hooks are made to project, by means of a spring, after it has been introduced into the bladder. These hooks pierce the substance of the vesico-vaginal wall, and bring the edges of the wound into apposition. The cicatrix ought not to be examined for a fortnight. He has employed the suture twice, and, on both occasions unsuccessfully; but he has employed the *sonde-airigne,* after cauterization, fifteen times, and in nine of these with success. All of these nine cases were cured by the second, many of them by the first operation.

Dr. James Reid† recommends, as a valuable palliative in cases apparently incura-

* Archives Gén. de Médecine, Mars 1843. † Lancet, Feb. 18, 1843.

ble, the introduction into the vagina of a caoutchouc bottle, to which a female screw and stopcock have been attached, and then distending it with air, by means of a syringe, until the patient cannot conveniently bear its further distension. The bottle may be withdrawn, for the purpose of injecting the vagina, &c., by merely letting out the air. Two cases are recorded, in one of which the catheter also was used, though not regularly, in the other it was not employed at all; and both patients were treated under great disadvantages. The use of the indian rubber bottle, however, was followed by complete closure of the fistula in one of these cases, while in the other the patient was placed by it in a state of comfort, and enabled to retain her urine for a considerable time. [This plan seems preferable to the mode recommended by M. Leroy d'Etiolles,* who cuts a leaf of caoutchouc, three or four fingers' breadth long, and having applied it to the fistula, plugs the vagina with balls of charpie rolled in caoutchouc reduced to a kind of paste. With these balls of charpie thus invested with indian-rubber, he can distend the vagina more or less, according to circumstances. The ordinary caoutchouc bottles hitherto employed in these cases have this disadvantage, that it is not possible to regulate the distending power they exert.]

DISEASES OF THE UTERUS.

Dr. Lever's† valuable work contains some interesting observations on the *frequency of organic diseases* of the uterus. He concludes, from the investigation of 2588 cases, that 31 per cent. of all diseases of the uterus are organic; or, including also the data furnished by others, that 34·7 per cent. are organic, and 65·2 per cent. functional.

Dr. Simpson‡ animadverts, in a series of papers, on the insufficiency of any of the present means of investigation for forming a correct *diagnosis* in many varieties of *uterine disease*. To supply this deficiency he recommends the employment of an *uterine sound* or *bougie*, by which when introduced into the uterine cavity it is possible "to ascertain the exact position and direction of the body and fundus of the organ; to bring these higher parts of the uterus in most instances within the reach of tactile examination, and to ascertain various important circumstances regarding the os, cavity, lining membrane, and walls of the viscus." This instrument resembles a common male sound, but is rather smaller; it is bulbed at the end to prevent its injuring the uterus, but tapers gradually from the handle to the bulb, being one fifth of an inch in diameter at the former, one tenth of an inch at the latter situation; and the bulb is one eighth of an inch in diameter. Its stem is nine inches long, and it is graduated in order to measure the dimensions of the uterus. There is a small knob on the stem two inches and a half from the bulb, that being the ordinary length of the uterus, and the further graduation of the instrument is effected by a series of shallow double grooves, half an inch or an inch from each other.

The introduction of the instrument is said to be usually attended with but very slight uneasiness, and in a few cases only with feeling of sickness; the occurrence of any actual pain indicates that the lining membrane of the uterus is not in a healthy state. Dr. Simpson proposes applying this instrument to ascertain many obscure points in cases of uterine disease; his recommendation of it, however, appears to be often founded on reasoning, rather than on actual trial. He proposes its employment to rectify various malpositions of the uterus [in which he appears to have been partially anticipated by Osiander,§ who employed his dilatorium orificii uteri with success to effect the reposition of a retroverted uterus.]

Displacements of the uterus. Prolapsus uteri. Mr. Snow‖ has suggested a useful modification of the sponge pessary, which consists in enveloping a piece of sponge, of the proper size and shape, in oiled silk, and tying it firmly at one end, so as to leave a small stem or tail, half an inch in length, by which it can be removed. An instrument-maker of Paris, M. Bienaimé¶ has invented an apparatus for prolapsus

* Gazette des Hôpitaux, Sept. 13, 1842.
† Practical Treatise on the Organic Diseases of the Uterus; London, 1843.
‡ London and Edinburgh Monthly Journal, June, August, and November, 1843.
§ Kilian, Operationslehre f. Geburtshelfer, II Theil, S. 211.
‖ Med. Gazette, April 14, 1843.
¶ A description and engraving are given in Annales d'Obstétrique, Août 1843.

uteri very similar to Hull's bandage. Dr. Simpson* proposes, and has used with success in an instance of very aggravated procidentia, a modification of the ordinary pessary. This consists, in the addition to the common stem and cup-shaped pessaries, of a short central stalk of nickle or silver wire, which is passed into the cavity of the cervix, so as to maintain the replaced organ in the cup of the instrument.

Organic diseases of the uterus. Hypertrophy of the uterus. Dr. Arnal† recommends the aqueous extract of the ergot of rye in hypertrophy and other chronic affections of the uterus. Active inflammation contra-indicates its use, but in chronic engorgements of the uterus, in uterine catarrh, leucorrhea, and those œdematous engorgements which accompany the chlorotic habit, it was uniformly beneficial. The aqueous extract has from five to six times the strength of the powder; it was given by M. Arnal at first in small doses, which he gradually increased until the patients took about fifteen grains daily, and this treatment was continued on the average for three months. No disturbance of the circulation followed its employment, nor was any effect produced on the general health except that slight pains were experienced in the uterine region, similar to those which precede menstruation. The other remedies employed were repose, the use of the hip-bath, and emollient or slightly astringent injections into the vagina; and in cases of chlorosis or chronic leucorrhea, the iodide of iron was advantageously combined with the ergot. This treatment was employed with uniform success in 36 cases; ulceration of the cervix uteri coexisted with the other affection in 22 instances; but as a general rule, the cure of these ulcers was not found to be expedited by cauterization.

M. Jobert‡ describes a peculiar affection of the unimpregnated uterus, which may be confounded with hypertrophy of the cervix. It consists in the distension of the cervix by fluid, which excites uneasy sensations, but escapes, with considerable relief to the patient, at each menstrual period. While the cervix is developed by the accumulation of fluid, its orifice becomes nearly obliterated, and a sense of fluctuation is easily perceived by the finger. The introduction of a catheter is followed by a gush of adhesive yellowish-white transparent fluid, when the distended cervix collapses, and the patient experiences great relief. It is a condition that occurs only in women of a lymphatic temperament, and who have never had any children. Its treatment consists in incising the cervix at the commissures of the os, by which the fluid is evacuated, and prevented from collecting again.

Inflammation of the uterus. An interesting case of inflammation of the uterus, terminating in abscess which communicated with the rectum, is related by Dr. F. Bird.§ The patient was 37 years old; her health had been good until she married at the age of 34. Soon afterwards she began to experience pain in the pelvis, increased by micturition and defecation. A sudden discharge of pus from the rectum was followed by considerable relief to the pain, but during the succeeding two years she suffered from purulent diarrhea, though on the whole her general health improved during this period. At the end of this time, however, all her previous symptoms returned with greatly increased severity; menorrhagia, too, came on, and the patient sank. The uterus was firmly attached by its upper and posterior part to the rectum, and the fundus uteri was thrice the natural size. This enlargement of the fundus was produced by an abscess in its parietes, containing an ounce of thick pus; and communicating with the rectum by a sinus, that was wide enough to admit a probe. No communication existed between the uterine cavity and the abscess. A case is likewise recorded by Dr. Lever,‖ in which the walls of the uterus contained a deposit of purulent-looking fluid, about the size of a kidney-bean. [The only cases with which Dr. Bird appears to be acquainted, are those related by Boivin and Dugés. Mention of others will be found in Busch, Geschlechtsleben des Weibes, Bd. iii, S. 701; Meissner's Forschungen, Bd. v, S. 167; and Meissner's Frauenzimmerkrankheiten, Bd. i, S. 928.]

Dr. Lever¶ notices that after the cure of *inflammation of the os and cervix uteri*, an intolerable pruritus sometimes continues, which may give rise to a state bordering on nymphomania. This is usually attended with slight leuchorrheal discharge, and

* Lond. and Edinb. Monthly Journal, July 1843, p. 660. † Bull. Gén. de Thérap., Août 1843.
‡ Gaz. des Hôpitaux, Jan. 10, 1843. § Lancet, Jan. 28, 1843.
‖ Op. cit., p. 27. ¶ Ib., p. 77.

sometimes considerable redness of the vagina is induced by the patient's rubbing herself to relieve the itching. On an examination, the finger is often stained with blood; and on introducing the speculum the os uteri is seen to be beset with numerous small granules, not unlike millet-seeds, white, soft, seemingly vesicular, generally in great numbers, and consisting of the enlarged glands of the os and cervix uteri. If there be much local tenderness, cupping or leeching may be necessary; if not, it will be sufficient to attend to the general health, and to employ injections of a drachm of sulphate of iron to a pint of water; or of five grains of nitrate of silver to an ounce of water.

Ulceration of the cervix uteri. M. Gosselin* denies that any peculiar symptomatic value is to be attached in the great majority of cases to ulcers of the cervix uteri. He regards them as forming only a very accessory part of the disease, which really consists in inflammation of the uterine tissue, especially of its lining membrane, against which, and not against the mere ulceration, remedial efforts should be directed. He details several observations, the purport of which is to prove that ulcerations of the cervix uteri give rise to no special symptoms, that they merely indicate the existence of a fully developed chronic metritis; and, except in syphilitic cases, need no peculiar attention. His experience also leads him to the important practical conclusion that local caustics have been far too extensively employed, that treatment should be directed to the uterine engorgement and consequent uterine catarrh, not merely to the cure of the ulcerations. It is evident that the ulcers may be cured by caustic, and yet the uterine catarrh and the general symptoms continue unchanged; since the application of caustics to the cervix uteri can have no influence on the diseased lining membrane of the organ. In the treatment of ulcers of the cervix uteri, M. Jobert† prefers the actual cautery to any forms of caustic. Having introduced an ivory speculum into the vagina, he employs cauterizing irons with a small button at the top. Their application does not excite the slightest pain, nor is it ever followed by any serious symptom, while it often gives most speedy relief. It has the advantage of not being followed by severe pain, such as succeeds the use of the nitrate of silver, while its action never extends beyond the spot to which it is applied; and in this respect it is preferable to the caustic potash. M. Jobert uses it especially in those large fungoid ulcerations, attended with frequent hemorrhage and neuralgic pains, which generally coincide with hypertrophy and ramollissement of the cervix.

Polypus uteri. M. Marchal de Calvi has published a very elaborate paper‡ on the spontaneous cure of this affection, founded on twenty-four observations, of which only one came under his own notice. It appears that this is effected in different ways. Sometimes the pedicle of the polypus is strangulated by the os uteri, and gangrene taking place it is thus detached; or the action of the uterus separates it during some of the violent attacks of hemorrhage to which patients suffering from this affection are liable; or the pedicle becomes gradually elongated, and is at last broken by the weight of the tumour; or it becomes detached during labour either by the head of the child pressing on it, or by the action of the uterine contractions.

M. Lisfranc§ advocates the excision of polypi in almost all cases, as preferable to the employment of the ligature; and states that he has seen serious hemorrhage succeed its performance only twice in one hundred and sixty-five times. Still in any case where the patient is already extremely exhausted by frequently repeated hemorrhage, it may be the more prudent plan to employ the ligature. The wound which follows the excision is sometimes very indisposed to heal, and may, unless attended to, degenerate into a troublesome ulceration. It is not, however, at all serious in its character, but yields readily enough to cauterization.

Extirpation of the uterus. The son of Professor Langenbeck, of Göttingen, has published‖ an account of the post-mortem examination of a person, whose uterus had been extirpated by his father in 1813, and who survived the operation twenty-six years. Considerable prolapse of the uterus existed; a circumstance which facilitated the operation of enucleating the uterus without wounding the peritoneum. Doubt

* Archives Gén. de Médecine, Juin 1843. † Gaz. des Hôpitaux, Mars 15, 1843.
‡ Annales de la Chirurgie, Août 1843.
§ Clinique Chirurgicale de l'Hôpital de la Pitié, t. iii, p. 210, and Gaz. des Hôpitaux, Oct. 18, 1842.
‖ De totius uteri extirpatione, auctore M. Langenbeck; Gottingæ, 1842.

has been expressed by many, as to whether Langenbeck had completely extirpated the organ; but the description of the post-mortem examination, and the drawings by which the dissertation is illustrated, show that he had completely succeeded. The dissertation contains, also, historical details with reference to the operation, and displays much diligence and research. A fatal case of extirpation of the uterus is recorded by Mr. Heath, of Manchester;* in which the operation was commenced under the impression that the body to be removed was an ovarian tumour.

DISEASES OF THE UTERINE APPENDAGES.

Diseases of the ovaria. Tumours and dropsy of the ovaria. Dr. A. Kilgour† endeavours to point out the signs distinguishing solid tumours of the ovaries associated with effusion into the peritoneum, from ovarian dropsy. In the diagnosis between these two a point of considerable practical importance is involved, since while it is generally thought undesirable to tap an ovarian cyst, considerable benefit often results from evacuating the fluid from the peritoneum in cases of solid ovarian tumours. Dr. Kilgour details three cases fully, and gives a tabular view of twenty-five others, which illustrate his views. His remarks for the most part substantiate the opinions of Curveilhier and Rostan, without adding to them anything very novel. He notices especially the gravitation of ascitic fluid, owing to which the small intestines are generally found yielding a clear sound about the umbilical region. Solid tumours of the ovary usually have a remarkable mobility, and their different surfaces will often come under the hand of the examiner, while in dropsy of the ovaries the swelling is fixed and immoveable. In ovarian dropsy, too, the neck of the uterus is drawn upwards, sometimes to so great an extent as not to be within reach of the finger when introduced into the vagina.

Two cases of accidental rupture of an ovarian cyst are recorded by Dr. Schlesier,‡ and Mr. Domville.§ In the first case the patient survived, but as her health gradually improved, the fluid collected again, and the abdomen, which had collapsed on the receipt of the blow, eventually regained its former size. Mr. Domville's patient died in a few hours. The ovarian sac was found extensively connected by old adhesions with the viscera and the abdominal parietes, although no inflammatory symptoms had existed during life. Other cases are related illustrative of the difficulty of determining, beforehand, whether an ovarian sac is adherent to surrounding parts, and on this difficulty Mr. Domville founds objections to the operation of extirpation of the ovary.

Dr. Ollenroth has published an essay, entitled, 'Ovarian Dropsy Curable,'‖ in which he advocates an operative proceeding, of a rather novel character, but somewhat analogous to the method first suggested by Le Dran, and afterwards by A. G. Richter. It consists in puncturing the abdomen in the ordinary manner, but, instead of completely emptying the cyst, allowing of the escape of only a portion of its contents, as, for instance, a fourth, or a third. The canula is not, however, to be then withdrawn, but merely closed by a stopper adapted to it, and a bandage that will easily admit of being tightened, is to be placed round the abdomen. The stopper is to be removed, and some of the fluid to be permitted to escape once or twice a day; by which means, the cyst is gradually brought to contract, and its walls adhering to each other, the patient becomes perfectly cured. This plan has been practised with success by Dr. Ollenroth, in one instance. The patient was 49½ years old, had suffered from ovarian dropsy for eight years; had undergone paracentesis seven times; on each occasion at shorter intervals, and her general health was completely broken down, when this plan of gradually evacuating the cyst was resorted to. The operation was performed on May 12th; and on the four succeeding days the stopper was removed from the canula twice every day; from the 16th of May to the 6th of June it was removed once daily. The fluid, which at first was yellowish, tenacious, and such as is usually contained in ovarian cysts, became by degrees puriform, and horribly offensive; but the patient's health appears to have gone on improving. On the 6th

* Med. Gazette, Dec. 9, 1843.
† London and Edinburgh Monthly Journal, June 1843.
‡ Casper's Wochenschrift, Aug. 5, 1843.
§ Med. Gazette, Nov. 25, 1843.
‖ Die Heilbarkeit der Eierstocks-wassersucht; Berlin, 1843.

of June no fluid escaped from the canula, which was removed on the 8th; and on the 12th, the wound made by the puncture was perfectly healed. The abdomen was, at that time quite collapsed, nor has it subsequently enlarged, and after a lapse of more than two years the person continues in good health, and capable of very considerable bodily exertion, without any indication of her former disease having reappeared. Very interesting historical details, with reference to the various operations that have been attempted for the cure of ovarian dropsy, occupy a great part of the pamphlet, but no other instance in which Dr. Ollenroth has tried this method is recorded. He employed it, however, in a case of chronic ascites, for which the patient had been tapped twice; her health deteriorating rapidly after each puncture. This new mode of procedure gave her temporary relief; and her death, which took place 31 days afterwards, does not appear to have been accelerated by it.

Considerable interest has been excited by an attempt to revive the operation of gastronomy, for the removal of diseased and dropsical ovaria. This attempt originated with Dr. Clay,* of Manchester, four of whose patients survived the operation, two sank under it, in one of whom it was left unfinished. Mr. H. D. Walne† has performed it in five cases; thrice successfully; one patient died, and in one the operation was abandoned, on account of difficulties which presented themselves, after it had been commenced. Successful cases have occurred to Mr. Southam,‡ Dr. F. Bird,§ Mr. Lane,|| and Dr. J. Atlee,¶ who is said to have removed both ovaries. Fatal results followed the operations of Messrs. Key, Cooper, and Greenhow:** and Dr. Foltz, in his report of Dr. Atlee's case, mentions an instance, hitherto unknown, of the fatal issue of the operation, in the hands of Dr. M'Dowall. It appears, that having laid open the abdomen of a woman, with the intention of removing a diseased ovarium, he found that the supposed tumour was formed by a mass of intestines agglutinated together by adhesions. The wound was closed, but the patient died of the effects of the operation. Mr. Heath's fatal case, already alluded to, at page 547, is another instance of the difficulties in the way of forming a correct diagnosis. Mr. Walne was the first to suggest making a small exploratory incision, with the view of ascertaining the presence or absence of adhesions, before laying open the whole cavity of the abdomen. In other respects, however, his operation coincided, as did the others, with the exception of Dr. Bird's, with that practised by Mr. *Lizars*, and involves the laying open the whole, or nearly the whole, extent of the abdominal cavity. Dr. F. Bird, anxious to avoid what he conceives to be an unnecessary exposure of the peritoneal cavity, has performed what may be regarded as an intermediate operation, between the major, as performed by Mr. Lizars, and the minor, as practised by Mr. Jeaffreson. He makes an opening, from four to six inches long into the abdomen, then punctures the tumour, and having evacuated its fluid contents, ties and divides the pedicle. This practice, which is similar to that attempted in one instance by Dr. Dohlhoff, of Magdeburgh, permits the introduction of the hand into the abdomen, and, consequently, the division of adhesions, and the secure application of ligatures to the pedicle; points which give it, in the opinion of Dr. Bird, the superiority over Mr. Jeaffreson's operation.††

* In a pamphlet, reprinted from vol. vii of the Med. Times; also in the same journ. for Oct. 7, 1843.

† His successful cases are reprinted from the Med. Gazette; the particulars of his unsuccessful cases have just been published in the Medical Gazette for Feb. 23 and March 1, 1844.

‡ Med. Gazette, Nov. 17 and 24, 1843. § Ibid., August 18 and Dec. 29, 1843.

|| The particulars of Mr. Lane's case are not yet published; some interruption having occurred to the convalescence of the patient; on which account he has delayed its public announcement till he can speak with certainty of the result.

¶ Reported by Dr. Foltz, who, however, did not witness the operation, in New York Journal of Medicine, for Sept. 1843.

** Mr. Key's case is contained in Guy's Hospital Reports, Oct. 1843; the other two were read at the Medico-Chirurgical Society, and are reported in Medical Gazette, Jan. 19, 1844.

†† The arguments for and against the operation, and the results hitherto obtained by its performance, are discussed in the Br. and For. Med. Rev., Oct. 1843 and Jan. 1844. In his enumeration of cases in which the operation was not completed, the writer of that article has omitted to notice the two cases recorded by Dr. Gooch, in his Account of some of the most important Diseases of Women, pp. 222-23, in which, after the abdomen was laid open, it was discovered that no tumour existed. In both these cases, the patients survived.

III.—ON THE PROGRESS OF KNOWLEDGE WITH REFERENCE TO THE DISEASES OF CHILDREN.

1. Diseases of the Fœtus.

Dr. Keiler,* and M. Souty,† each detail a case of singular *congenital disease of the skin*, somewhat resembling icthyosis. In Dr. Keiler's case, the mother had had three healthy children, and after suffering severe abdominal pain from the third month of her fourth pregnancy, was confined, in the seventh month, of a child, who cried feebly, and survived only twelve hours. The skin of its head, face, and whole body was hard, thickened, of a structure resembling cartilage, and rent by deep irregular fissures. Tubercular prominences, without apertures, existed in the situation of the nose and ears, red fleshy masses occupied the orbits, and the genitals were represented by a mere knob. The skin of the trunk and extremities was less affected than that of the head and face. The mother, who was perfectly free from any syphilitic taint, subsequently gave birth to a healthy child. In M. Souty's case, it is probable, as Dr. Simpson observes, in some remarks upon it, appended to Dr. Keiler's paper, that the disease was originally of the same character, but had partly undergone the reparative process. The body of the child was traversed by reddish bands, inclosing irregular patches of scaly skin, in which the epidermis was hard, thick, and rough. The surface of these bands, or cicatrices, was covered with a thin, smooth pellicle, beneath which was the true skin with its texture unaltered. The nose and ears were in a rudimentary state, being deformed by the thickened epidermis: the eyes were natural in structure, though concealed by the everted eyelids; the disease of the skin having arrested the growth of the tarsal cartilages. The extremities were well formed, though disfigured by collections of matter beneath the skin. This child lived fifty hours.

A case of *croup in the fœtus* is related by Dr. Hayn.‡ He found, on examining the body of a child that died half an hour after birth, all the bronchi, both small as well as large, lined with a membrane, which was tubular in the larger branches, but quite blocked up the smaller ramifications. It was of a yellowish-green colour, and when examined under the microscope exactly resembled the exudation of croup.

2. Diseases peculiar to earliest Infancy.

Injuries to the head in labour. M. Danyau§ relates four cases in which fracture of the cranial bones occurred in the course of natural labour. In three cases the pelvis was contracted, in the fourth its dimensions were natural; and in none of the cases were the forceps employed. M. Danyau is of opinion that in the fourth case, in which the fracture could not have been the result of direct pressure, the parietal bones must have been forced over each other, and having bent to their utmost, then given way.

Cephalæmatoma. Dr. Churchill ‖ has published a valuable digest of what has been written on this subject, but does not contribute to it any new matter. Dr. Zöhrer¶ of the foundling hospital at Vienna, regards it as a graver affection than the researches of Naegele, Feist, &c. represent it as being. He is accustomed to employ cold applications, to give calomel internally if there be much cerebral congestion; and it appears to be his invariable practice to open the swelling. It is evident from the directions he gives for the management of suppurating cephalæmatoma that the affection, under this plan of treatment, often becomes very serious. Dr. Doepp,** of the foundling hospital at St. Petersburgh, has met with 262 cases in 50,000 children: or 1 in 190. Of these, 64 per cent. were on the right, 31 per cent. on the left side of the head; and 5 per cent. on both sides. All were seated on the parietal bone except one, which occupied the squamous portion of the temporal, and two on the occipital bone. In his description of the disease he agrees with Naegele, Feist, and most recent observers, except in the opinion he expresses that the hard ring round the tumour

* London and Edinb. Monthly Journal, Aug. 1843. † Bull. de l'Acad. de Méd., Oct. 1842.
‡ Medicinische Zeitung, Feb. 8, 1843. § Journal de Chirurgie, Jan. 1843.
‖ Dublin Medical Journal, Nov. 1843. ¶ Med. Jahrb. des k.k. Oester. Staates, Dec. 1842.
** Oest. med. Wochenschr., Jan. 1, 1843.

usually disappears in four or five days. [The results of the writer's own observation too lead him to believe that Doepp is in this instance mistaken.] He confirms the opinion that the hard ring is formed by the edge of the coagulated blood effused beneath the pericranium; and states that it is only in rare cases, where the disease has been neglected, and the outer table of the skull has in consequence become absorbed, that the round edge of the inner table forms this ring. Three children died of the disease, two of whom were worn out by long-continued suppuration; one died of inflammation of the membranes of the brain, induced by cauterizing the tumour with lunar caustic. If absorption of the blood do not seem to be commencing after fomentations have been employed for a fortnight, M. Doepp is accustomed to make an incision, and to treat the wound with water-dressing. [In this interference he is probably premature; absorption does not always become perceptible within the first fortnight, and Feist's* experience makes it manifest that the best treatment of cephalæmatoma is to let it alone.]

Infantile erysipelas. Dr. Martin, of Jena†, endeavours to prove that this disease does not differ in any important respect from erysipelas in the adult, though it presents some peculiarities in its phenomena, course, and results. The skin in the infant has more of a velvety appearance, and is not so shining as in the adult; vesication seldom takes place, but small collections of pus in the subcutaneous cellular tissue are very frequent, and occur simultaneously in different parts; by no means confining themselves to those where the erysipelas originally commenced. Its wandering character is another distinguishing feature of the disease in the child, as also is its tendency to gangrene. It prevails sometimes epidemically; and did so at Jena at a season when erysipelas was frequently met with in the adult, and when phlebitis often followed venesection, an accident which occurred at that period in almost all the cases of puerperal fever in the lying-in hospital, in which blood was abstracted from the arm. Dr. Friebe‡ describes a peculiar form of erysipelatous inflammation of the neighbourhood of the navel which occurs in early infancy, and for which he proposes the name of *omphalitis exsudativa.* He has seen it thrice, coming on three weeks after birth, commencing about the umbilicus, and attended with infiltration of lymph or pus into the subcutaneous cellular tissue, and deposits of a similar matter in the partially obliterated umbilical vessels. It proves fatal in the course of forty-eight hours, without having extended further than three fingers' breadth around the navel; rapidly increasing exhaustion and occasional convulsive symptoms being the chief constitutional phenomena to which it gives rise. He inclines to regard it as a variety of partial *induratio telæ cellulosæ*, on account of the cachectic character of the children in whom it occurred, as well as the erysipelatous nature of the inflammation; while the fact of the umbilical vessels being in part converted into fibrous cords before the commencement of the disease induces him to think that it does not arise from phlebitis.

Aphthæ and muguet. Dr. Oesterlein§ has investigated the nature of the false membranes formed in cases of aphthæ and muguet, and has submitted them to microscopic examination. Under a moderate power they appear as an agglomeration of roundish corpuscules, intermixed with cylindrical fibres. Under a high power these fibres appear jointed and hollow; a transverse partition dividing the canal at each joint. Many of these fibrillæ contain sporules, which are round granules 0·0008 to 0·0012 of a Paris inch in diameter: many too beset the exterior of the fibrils, or float free around. It appears, however, that these structures are seen only at the period of the fullest development of the aphthæ, and Dr. Oesterlein's opinion is that the essence of the disease consists in an inflammatory condition of the mucous membrane of the mouth, which tends very rapidly to exudation, but that the formation of confervæ is

* Ueber die Kopfblutgeschwulst der Neugebornen; Mainz, 1839, 4to.

† Neue Zeitschrift für Geburtskunde, xiii Band, S. 402.

‡ Journal für Kinderkrankheiten, Oct. 1843.

§ Allg. Med. central Zeitung, 30 Nov. 1842. Dr. Gruby, whose researches were carried on at a period anterior to that included in this Report, holds the opposite opinion. See Clin. des Hôpitaux des Enfans, Sept. 1842. He regards the parasitic deposit or aphthophytes as the essential part of the disease; ulcerations, &c. as accidental complications. See also the observation of Dr. Berg of Stockholm, in the same journal for August, 1842.

accidental. In spite of many attempts to transplant the confervæ to other animal tissues or fluids he could never succeed in so doing. Dr. Effenberger* describes the muguet as he observed it during six months' residence in the foundling hospital at Vienna. It is there a very frequent and very fatal malady. The disease is probably in a great measure owing to the great crowding of the children; having been diminished since improved ventilation has been resorted to; but there does not seem to be any reason for regarding it as of a contagious nature. Its appearance was often announced by the occurrence of an erythematous eruption on the buttocks, sometimes of a papular, at other times of a vesicular character; and it was attended with diarrhea that frequently became very obstinate. The papillæ of the tongue became enlarged and elevated, and then covered with a white deposit which extended by degrees over the whole interior of the mouth. In bad cases deep ulcers appeared on the arch of the palate, which impaired the voice and rendered deglutition very difficult. The more dangerous cases too were marked by the increasing severity of the diarrhea, which exhausted the patient and occasioned death. After death the gums were found ulcerated; and the mucous membrane of the stomach red, soft, thickened and excoriated. The follicles of the small intestines were tumefied and sometimes ulcerated, and those of the large intestines, as well as the mesenteric glands, were swollen. The blood was fluid and the lungs were anæmic, except in those cases in which pneumonia had existed, when they were more or less extensively hepatized. M. Trousseau† remarks on the difference between idiopathic and symptomatic muguet. The latter is an accidental complication of various grave maladies, such as occur in foundling hospitals. The idiopathic form comes on without any more serious symptom than some heat of skin and fretfulness for a few hours before its eruption; and afterwards there is but slight derangement of the health, and perhaps a little diarrhea. In either form the same local applications are proper, such as one part of hydrochloric acid to ten of water, or one of nitrate of silver to ten of water, or one of alum to three of honey.

3. Diseases of subsequent Childhood.

DISEASES OF THE BRAIN, NERVOUS SYSTEM, ETC.

Acute hydrocephalus. Very interesting statistical details with reference to the frequency of this disease, and the various circumstances which influence its occurrence, are contained in Dr. Bennett's essay on hydrocephalus.‡ He follows the data furnished by the tables of the registrar-general, from which he concludes that five per cent. of all deaths under fifteen years of age arise from this disease, and the Berlin bills of mortality yield a similar result. It further appears that residence in cities greatly increases the tendency to hydrocephalus, and this tendency increases in almost direct proportion to the degree of crowding of the population. The statement quoted from American writers that during the last thirty years hydrocephalus has increased twelvefold in New York, while the population has only quadrupled, is, however, probably exaggerated; for a disease may often appear to be more frequent simply owing to its becoming better known. Dr. Bennett shows that hydrocephalus is most frequent from two to seven years of age; that it is much more frequent and twenty per cent. more fatal in males than in females. MM. Rilliet and Barthez treat of the disease§ under the name of *tubercular meningitis*, reserving the term hydrocephalus acutus‖ for those cases in which an accumulation of serum takes place rapidly but not as the result of inflammation in the cavities of the cranium or in the cerebral substance, [an attempt at strictly scientific nomenclature scarcely warranted by the present state of our knowledge.] They have not met with this effusion of serum as an idiopathic affection, but only as a secondary occurrence, and usually supervening in the course of the eruptive fevers.

Dr. Christie of Keith, and Dr. Wöniger of Hamburgh,¶ have published cases of the successful employment of iodine in the treatment of acute hydrocephalus. In both

* Oest. med. Wochenschr., March 4-11, 1843.
† Gazette des Hôpitaux, May 18, 1843.
‡ The Causes, Nature, etc. of Acute Hydrocephalus. 8vo. London, 1843. Chap ii.
§ Traité des Maladies des Enfans, tom. iii, p. 492.
‖ Ibid., t. i., p. 781.
¶ London and Edinburgh Monthly Journal, March 1843; Oppenheim's Zeitschrift für die gesammte Medicin, April 1843.

instances the disease had reached the paralytic stage, and all other means had been tried in vain. Dr. Christie gave a teaspoonful of a solution of pot. iodid., gr. xvj, iodine gr. iv, in water ℥j, every 4 hours, and rubbed the scalp with a weak ointment of the biniodide of mercury; and Dr. Wöniger dissolved ʒj of iodide of potassium in ℥ss of water, and gave at first 40, afterwards 50 drops every two hours. In Dr. Christie's case, the first indication of improvement appeared in 36 hours, in the other instance, not till after the lapse of three days, but in both, recovery was complete.

Under the name of *meningitis mesencephalica*, Dr Brockmann,* describes a peculiar form of cerebral affection, incidental to childhood. He wishes by the name that he applies to it, to express the fact that the membranes of the medulla oblongata and pons, are the chief seat of the disease. He first observed it as a sequela of scarlatina, but has since seen it occur as an idiopathic affection, and altogether has met with it in fourteen cases. It is sometimes associated with general affection of the brain; at other times it is uncomplicated, but though its earlier stages are not marked by any serious symptoms, it is a disease quite as dangerous as cerebral meningitis. In its uncomplicated form, the cerebrum generally is extremely pallid and bloodless, showing a striking contrast to the cerebellum, the veins of which are turgid with blood, while its substance also is often highly congested. This congestion increases in intensity about the central parts of the encephalon, and the membranes covering the pons and medulla oblongata, are found in a most marked state of inflammation, though no such condition is seen in the membranes of the cerebellum, but the inflamed membrane is perfectly isolated, and usually not more than a square inch in extent The inflammatory action produces effusion of fluid, sometimes to the extent of several ounces into the subarachnoid tissue: or sometimes a gelatinous matter is effused, or the exudation is of a purulent nature.

It is most frequent in previously healthy children, from three to ten years of age; and no marked symptom betrays the first period, or that of simple turgescence, which generally lasts one or two days. The child is dull and heavy, and the occiput is often hot, but the bowels are regular, there is no vomiting, intolerance of light, or disturbed sleep. The general dulness and vague complaints about the head increase in the inflammatory stage, besides which there are notable heat of the back of the head, retraction of the occiput such as comes on in the advanced stages of ordinary hydrocephalus, and convulsive twitchings of the limbs similar to the effect of slight electric shocks, recurring every few minutes while the patient is awake, but ceasing during sleep. The general febrile symptoms continue during the third stage, the pulse loses its frequency and fulness, but does not become either irregular or intermittent. The state of general disquietude subsides by degrees into a comatose condition, in which the occiput is more retracted than before, but in which there is no strabismus nor affection of the pupil; and the peculiar air of stupidity that characterizes hydrocephalic patients is wanting. Two pathognomonic symptoms, however, announce the occurrence of this, the stage of effusion. One of these is deafness; the other is difficult articulation, and difficulty in moving the tongue; both of which occur at the same time, probably from paralysis of the motor nerves of the tongue. Usually the deafness and the affection of the tongue come on suddenly; sometimes the child awakes from quiet sleep with them. They are the earliest and surest signs of effusion. This stage ends sometimes in three days, sometimes not till after a fortnight in fatal paralysis; which is ushered in by various singular nervous phenomena; as sudden pauses in the respiration, or equally sudden syncope. Sometimes, however, these anomalous symptoms subside, and the patients gradually recover; indeed until the paralytic stage is fully established, recovery may be considered possible.

The disease is to be treated by depletion, which in most cases should be local, by cold to the head, and the free administration of calomel. Calomel may still be employed in the stage of effusion; but ammonia should also be used; the strength must be supported, and wine may be required. The most powerful counter-irritants, as large blisters, or the actual cautery, are also sometimes useful.

Tubercle of the brain. Dr. Hennis Green† has published some observations on this subject accompanied with a tabular view of thirty cases. His observations were

* Holscher's Annalen, Bd. ii, S. 678, and Bd. iii, S. 3.

† Med.-Chir. Trans., vol. xxv, p. 182.

made at the Hôpital des Enfans Malades at Paris; and the large number of scrofulous cases in that institution will probably account for his estimate of the frequency of tubercular deposits in the brain being as high as one in fifty. The brief remarks which he makes on the morbid anatomy of the affection do not add anything to our previous knowledge, but the fact that tubercle was in no instance confined to the brain is interesting. In four of the cases no symptoms of cerebral tubercle existed during life, in four others the indications of its existence were very slight. In the remaining cases a chronic stage existed, in which the disease was betokened either by,—

1st. Headach, followed by various lesions of sensibility, or of muscular power; or,

2d. By convulsions, or epilepsy, gradually terminating in paralysis; or,

3d. By paralysis of one of the limbs.

He agrees with Bredow,* who has given the history of five cases of tubercle of the brain in regarding headach as the most important symptom, it having existed in seventeen cases. Next in frequency are partial or general convulsions, epilepsy, paralysis; or contraction of certain muscles or limbs, remarkable change of temper, and amaurosis.

In seventeen of the thirty cases, death took place from the supervention of some acute disease, as measles, variola or pneumonia, or the patients died in the course of phthisis. In thirteen cases, the chronic stage was succeeded by acute symptoms, which resembled more or less those of acute hydrocephalus. Dr. Green alludes to the anomalous character of the symptoms in some of these cases, and suggests that in those cases where hydrocephalus has appeared to run an anomalous course, the real cause of these peculiarities may have been the presence of tubercle in the brain. The observations of MM. Rilliet and Barthez,† agree for the most part with those of Dr. Green, though they appear to attach greater importance to the occurrence of convulsions than to the existence of headach, as a symptom of cerebral tubercle, and regard it as a more frequent symptom. In those cases where tubercular deposit in the substance of the brain or its membranes is unattended with symptoms betokening its existence, it will be found usually to coincide with far advanced tubercular disease in other parts, while the reverse is usually the case in those instances where marked cerebral disorder has existed. The various indications too of that obscure form of tubercular meningitis which often occurs towards the close of life in phthisical children are carefully detailed. An interesting case of tubercle of the brain in a boy aged two years, is recorded by Mr. Dunn.‡

Hemorrhage into the brain, or its membranes. Since the appearance of M. Becquerel's paper on this subject,§ it has been carefully investigated by M. Legendre‖ and MM. Rilliet and Barthez,¶ who have arrived at very similar results. Effusion of blood into the cavity of the arachnoid, appears to be the most common form of cerebral hemorrhage. Pure, unchanged blood, however, is but seldom found there; for it undergoes alteration very rapidly; the crassamentum separating from the serum and assuming in the course of time a membranous appearance. This membranous production forms first on the parietal layer of the arachnoid, afterwards on its visceral layer, thus forming a kind of cyst which is rarely empty, but generally contains a serous fluid in much larger quantity than that of the blood originally effused, and occasionally amounting to one or two pints. This accumulation of serum distends the yielding cranial walls of the child, and gives rise to a peculiar form of chronic hydrocephalus, which it is not always easy to distinguish from the same affection arising from other causes. Usually, however, the enlargement of the head takes place more rapidly than in ordinary chronic hydrocephalus, and the patients in which meningeal apoplexy occurs are always under two years of age, while chronic hydrocephalus from other causes often comes on at a later period of life. These cysts do not continue unaltered; but if the patient should survive, their contents become

* Med. Zeitung, Dec. 8, 1842. † Lib. cit., tome iii, p. 552.
‡ Med. Chir. Trans., vol. xxv, p. 209. § Clin. des Hôpitaux des Enfans, 15 Avril, 1842.
‖ Revue Médicale, Dec. 1842, and Feb. and March, 1843. ¶ Lib. cit., tome ii, p. 29.

gradually absorbed, and the two layers being thus brought into contact adhere at different points, and form a multilocular cyst, or several small cysts. Even this state does not continue; but the walls of the cyst, which sometimes have a stratified arrangement, indicating that several successive effusions of blood have taken place, become gradually converted into an opaque firm membrane, having a pearly lustre, and closely resembling the dura mater in appearance. The symptoms of meningeal apoplexy, or of that much rarer form of cerebral hemorrhage, in which the blood is effused into the substance of the brain, are extremely obscure, so much so, indeed, as to render their diagnosis from other cerebral affections extremely difficult; and they are hardly ever attended by those apoplectic symptoms which denote such occurrences in the adult. A case, indeed, is related by Dr. Allier,* in which a child aged two years, after being exposed to the sun, was seized with violent convulsions, affecting chiefly the right side, and followed by coma, and paralysis of the right side. The coma subsided within a fortnight; the paralysis abated by degrees, and finally disappeared at the end of three months. This case is regarded by Dr. Allier as having been one of cerebral hemorrhage; [it must, however, be borne in mind, that while symptoms of just this kind have been observed, where no trace of hemorrhage was found after death, no case in which a post-mortem examination revealed the existence of cerebral hemorrhage has been attended in the acute state by paralytic symptoms.]

Chronic hydrocephalus. Dr. Whitney,† having had his attention called to the subject of cerebral auscultation by the researches of Dr. Fisher, in 1838, has since frequently employed it, and believes that a recourse to it will aid in the diagnosis of various diseases of the brain. In chronic hydrocephalus he has found that a cephalic bellows-sound constitutes one very prominent symptom; the existence of which he has substantiated in five cases. The sound is heard most distinctly in those situations where ossification of the skull is incomplete. It is a coarse, rough, and rasping sound, synchronous with the pulsations of the brain, and movements of the circulatory apparatus. In one instance, in which the brain was punctured, the sound was modified by the evacuation of the fluid, and became a low and indistinct murmur, but regained much of its former character as the fluid reaccumulated. Dr. J. R. Smyth‡ likewise notices the existence of a cerebral murmur as symptomatic of the first stage of chronic hydrocephalus, and states that his discovery of the phenomenon was made without any knowledge of its having been previously observed by Dr. Fisher.

Dr. Hannay§ relates a case of chronic hydrocephalus, in which he believes that recovery was in a great measure due to the employment of an ipecacuanha liniment to the scalp. The formula he adopts is the following:

℞ Ipecac. pulv. ℨij.
Olei oliv., ℨij.
Adipis, ℥ss. M.

The employment of this liniment three or four times daily is followed in about thirty-six hours by a papular and vesicular eruption. This form of counter-irritation was extremely useful in the case alluded to, and Dr. Hannay is of opinion that since chronic hydrocephalus often succeeds to the suppression of eruptions on the scalp, the use of this counter-irritant, the effects of which are much more manageable than those of tartar-emetic ointment, will in such cases prove very beneficial.

M. Trousseau‖ insists on the importance of watching the effects of compression of the head, and relates a case in which the neglect of this precaution was followed by laceration of the brain, the escape of the fluid by the nares, and the patient's death. It was found that the resistance of the bandage had caused the fluid to act exclusively on the base of the brain, and that the ethmoid bone had thus been dissevered from its connexions.

In order to ensure a firm and equal pressure on the head, M. Trousseau is accustomed to employ the following method. The hair being clipped as short as possible,

* La Clin. des Hôp. des Enfans, Oct. 15, 1842.
† Amer. Journ. of Med. Sciences, Oct. 1843.
‡ Medical Gazette, May 19, 1843.
§ Edinb. Med. and Surg. Journal, Oct. 1843.
‖ Journal de Médecine, Avril 1843.

he applies strips of diachylon plaster four lines broad. 1st. From each mastoid process to the outer part of the orbit of the opposite side. 2d. From the hair at the back of the neck, along the longitudinal suture to the root of the nose. 3d. Across the whole head, in such a manner that the different strips shall cross each other at the vertex. 4th. A strip is cut, long enough to go thrice round the head. Its first turn passes above the eyebrows, above the ears, and a little below the occipital protuberances, so that the ends of all the other strips shall project about three lines below the circular strip. These ends are next to be doubled up on the circular strip, and its remaining two turns are then to be passed over them just in the same direction as the first turn.

In a case of chronic hydrocephalus, in a child aged 3 years and 4 months, Dr. Whitney* punctured the brain with success. Nine ounces of fluid were withdrawn by the first operation, and five ounces more on its repetition three weeks afterwards. No untoward symptom followed either operation, and the child's recovery appears to have been complete.

Two cases of the unsuccessful employment of puncture of the brain are recorded by Professor Wutzer and Mr. Butcher.† In the first case it had been supposed that the fluid was exterior to the brain; but no fluid following a slight puncture, it was not thought warrantable to plunge the trocar deeper. Six days afterwards the child, aged 7 months, died in convulsions; and 22 oz. of fluid were found in the ventricles. The subject of the second case was 16 months old; the previous symptoms had been severe. Tapping was twice performed; the second time four weeks after the first. The child appeared benefited by the operations, but died in convulsions eleven weeks after the first puncture, owing in great measure, in Mr. Butcher's opinion, to the mother having given it wine.

Paralysis. The writer of this Report has published a paper on the subject of paralysis in infancy and childhood.‡ He attempts a division of it into three forms, according as the affection is congenital; or succeeds to symptoms of cerebral disturbance; or comes on without any previous indication of disorder of the brain. It usually presents the form of hemiplegia, and the leg is affected by it oftener than the arm. Sensation is not impaired; occasionally, indeed, it seems to be morbidly increased. The first variety is usually associated with imperfect nutrition of the affected limbs, and, as might be expected, is incurable. Cases of the second class, for the most part, do well eventually; they are often associated with constitutional disturbance dependent on the process of dentition, and require an alterative plan of treatment, and close attention to the state of the bowels. Cases of the third class occur in debilitated children; and sometimes succeed the eruptive fevers. They often run an extremely chronic course, and the patient's recovery is in many cases only partial; or, although his general health may become robust, the limb may continue powerless; in which cases it wastes, and becomes much smaller.

DISEASES OF THE ORGANS OF RESPIRATION AND CIRCULATION; AND OF THEIR APPENDAGES.

Stomatitis. MM. Rilliet and Barthez§ notice the points of difference which distinguish between this disease and true cancrum oris. They remark upon its frequent occurrence, its tendency to prevail epidemically, its contagious nature, chronic course, and the absence of any disposition to become gangrenous; in all which respects it differs from cancrum oris. They mention, too, as characteristic of the disease, its tendency to the formation of false membrane. Dr. Hunt‖ applies the term cancrum oris to this affection; believing it to be only a milder form of gangrene of the cheek; [but the reasons for a contrary opinion, as stated by MM. Rilliet and Barthez, appear to be quite conclusive.] His chief object, however, is to recommend the internal administration of the chlorate of potash, which he believes to possess specific powers in controlling this affection. He is accustomed, after the use of a purgative if necessary, to give from 20 to 60 grains of the chlorate of potash, accord-

* Loc. cit. † Oesterr. Med. Wochenschr., Nov. 12, 1842; Dub. Journ. of Med. Science, March 1843.
‡ Medical Gazette, Sept. 8, 1843. § Lib. cit., tome i, p. 260, and tome ii, p. 149.
‖ Med.-Chir. Trans., vol. xxvi, p. 142.

ing to the age of the child, every twenty-four hours, dissolved in water. He states that its beneficial effect is often observed on the following day, almost always on the second; the disagreeable fetor soon lessens, the sores put on a healthy reparative action, the dribbling of saliva diminishes, and if there be mere ulceration it very speedily heals, if there be an eschar it soon separates, and the sore granulates kindly. MM. Rilliet and Barthez recommend the use of the chloride of lime in substance, as a local application to the foul ulcers of stomatitis, and advise that its employment should be continued for some time after a cure has apparently taken place.

Diphtheritis. M. Trousseau* remarks on the distinction between diphtheritis and true croup. He regards the former disease as being stomatitis in an aggravated and unusually severe form. Stomatitis in general is confined to the gums, which may continue affected by it for weeks or months; but it may also extend to the inside of the cheeks, which then become the seat of a pultaceous or membranous exudation. Sometimes, however, it is not limited to these situations; but false membranes appear on the uvula and tonsils, and give rise to the symptoms of angina maligna, when if prompt relief be not afforded, the disease involves the air-passages, and proves fatal. This occurrence is rare in the adult, but less uncommon in the child; and M. Trousseau speaks of a woman with an infant at her breast recently received under his care, the former of whom was suffering from the disease, limited to her gums; the infant caught it, the false membranes extended to its pharynx, and proved fatal. He alludes to its contagious character, and mentions some of the evidences of it adduced by M. Bretonneau. He states, also, that during an epidemic of diphtheritis, which came under his observation in the year 1828, the disease was confined to the gums in most adults, but involved the pharynx and larynx, and thus proved fatal to many children.

Croup. Dr. Ware† has written an elaborate paper on croup, which is valuable, as embodying the results of twenty-five years of observation. He is of opinion that two distinct diseases are generally included under the term croup, which, however, present considerable similarity to each other in their early symptoms. The more frequent of these affections is very mild in character, yields readily to remedial agents, and would probably subside, even though no treatment were adopted, while no neglect of curative measures would cause it to assume the grave characters of the second form. This second form, though much less frequent, is very violent; it is scarcely affected by any treatment, and almost invariably terminates fatally. In the course of twenty-five years, Dr. Ware has met with 131 cases of croup; the term croup being applied by him to every case in which there existed any embarrassment of the respiration, attended with affection of the voice, and a cough of a shrill, harsh, and ringing character. He subdivides these cases into the four classes of

	Cases	Deaths
Membranous croup	22	19
Inflammatory ...	18	-
Spasmodic ...	35	-
Catarrhal ...	56	-
	131	19

He distinguishes the first and second classes by referring to the first all cases in which there was reason to suppose that a false membrane had been formed, while the second differs from it only in the supposed absence of a false membrane. He relies for distinguishing the membranous form of croup less on the cough or voice than on the respiration. It is not loud, harsh, suffocative breathing, attended with great efforts and much loud coughing, creating great alarm, and calling at once for relief, but it is comparatively quiet and unobtrusive at the commencement of the disease, and unattended with apparent distress. There is only a little more effort than natural in inhaling and expiring the air, attended with slight dilatation of the nostrils, and a little whiz accompanying the passage of the air through the rima glottidis. Dr. Ware allows, however, that the characters of this form are but seldom met with so unmixed as in the above description; for paroxysms of violent spasmodic breathing occur,

* Gaz. des Hôpitaux, May 7, 1843. † New Eng. Quart. Journ. of Med. and Surgery, Oct. 184.

during which the respiration is accompanied with a loud râle, from the presence of mucus in the air passages. As the disease advances the muscular efforts at respiration become very strong, and the expiration is chiefly characterized by the amount of force used to expel the air.

Such are the symptoms enumerated by Dr. Ware as characteristic of the membranous form of croup. He acknowledges, however, that its symptoms are in a great measure common to the inflammatory form. His diagnosis between the two is founded on the presence of false membranes on the back of the fauces in membranous croup; an occurrence to which there are so few exceptions that of thirty-three cases of membranous croup, in which the fauces were examined, thirty-two presented false membranes on the tonsils, uvula, palate or pharynx. The diagnosis, however, was verified by a post-mortem examination only in fourteen cases, the others not having been examined after death; but in all of these fourteen, false membranes were found in the air-passages; and in one only they were present in the larynx, while no trace of them existed on the fauces.

In 45 cases of what he classes as the other forms of croup, three only presented a thin slight exudation on the tonsils; none a regular false membrane. Of these 45, 12 were of the second, 11 of the third, 22 of the fourth class.

He believes then that the membranous and inflammatory croups are different: 1st. Because the great preponderance of deaths over recoveries in the former, of recoveries over deaths in the latter; and the invariable presence of false membrane in the one, its invariable absence in the other, afford strong reasons for the supposition. 2d. Because, in his opinion, the effusion of false membrane requires an inflammatory action peculiar in kind rather than violent in degree. 3d. Because the phenomena which attend recovery from membranous croup are different in many respects from those which attend recovery from the simple inflammatory form.

Dr. Ware's third form of croup answers pretty nearly to laryngismus stridulus, [though he appears sometimes to have mixed up in his description some of the characteristics of true croup; thus falling into the error committed by Millar nearly a century ago.]

The fourth or catarrhal class includes cases which might more properly be called cases of threatening croup than referred to a separate form.

Mr. Copeman* recommends painting the exterior of the throat in cases of croup twice a day with a strong tincture of iodine. He conceives that it tends to prevent the formation of false membranes, and relates two cases in which its employment was apparently beneficial. M. Valleix† mentions in illustration of the good results produced by free vomiting in croup, that in 31 out of 53 cases antimony and ipecacuanha were employed in large doses as emetics, and 15 of the 31 recovered. In the remaining 22 their use was but sparingly resorted to, and only one recovered. It is probably as a powerful emetic that the sulphate of copper should be regarded; and Dr. Aberle‡ mentions the circumstances which should induce us to employ it in preference to the tartar emetic. These are a very depressed state of the system, in consequence of which the stomach has lost much of its natural irritability, and the occurrence of diarrhea as a consequence of the employment of antimony. Dr. Aberle speaks of having used it with success; and Dr. Schwabe§ talks of having given it in more than 50 cases. [Among these, however, were doubtless many in which none other symptoms existed than such as were premonitory of the disease, or as constitute the pseudo-croup of Guersent and other writers.]

The work of MM. Rilliet and Barthez contains an essay on tracheotomy, by M. Trousseau.‖ He attributes the fatal result which so often follows it to delay in its performance; and recommends that it should always be performed as soon as the presence of false membrane in the larynx has been ascertained. He prefers tracheotomy to laryngotomy; always introduces a canula into the trachea, but endeavours to dispense with its use as early as possible. He does not rely merely on the ope-

* Provincial Medical Journal, Aug. 12, 1843.

† Guide du Méd. practic., extracted in Bull. Gén. de Thér., Oct. 1843, p. 246.

‡ Oest. med. Jahrb., July and Sept. 1843.

§ Casper's Wochenschr., March 4, 1843.

‖ Lib. cit., tome i, p. 367.

ration, but sponges out the trachea with a sponge dipped in a solution of one part of nitrate of silver in five of water; and pours a few drops of a weaker solution into the air passages, a proceeding which he repeats several times during the first few days after the operation. Of 112 croup cases thus treated 27 recovered; or adding cases operated on by other surgeons we obtain a total of 150 cases and 39 recoveries, [a result probably not more favorable than is obtained by purely medical treatment.]

Retro-pharyngeal abscess. In a memoir on this affection M. Duparcque* mentions that 30 cases of it have been published since attention was first drawn to it by Dr. Abercrombie. Of these 30 cases 10 occurred in children from 11 months to 4½ years of age. He relates the history of a delicate boy aged 4½ years, who was attacked with febrile symptoms, attended with great cerebral disturbance, which was relieved by leeches. Difficult and painful deglutition, however, soon came on, accompanied with swelling of both sides of the neck, but especially obvious on the left side. These symptoms progressively increased, and became associated with extreme pain on pressure upon the larynx. At length there were signs of impending suffocation, with symptoms such as occur in an advanced stage of croup. On the eighth day after the commencement of the illness, during an attempt to examine the fauces, the patient made a sudden effort at vomiting, which was attended with the rejection of mucus, pus, and blood, and followed by great relief. The external swelling of the neck had disappeared, the child asked for food, and in a few days recovered. M. Duparcque regards this as having been a case of abscess behind the œsophagus, of which, and of retro-pharyngeal abscess, the symptoms are, 1. Swelling of the lateral parts of the neck. 2. Deglutition painful; at first difficult, afterwards impossible. 3. Laryngeal respiration, growing more and more difficult till it amounts to actual suffocation; which, 4, is rendered more imminent in certain postures. 5. Alteration of the voice. 6. Stiffness of the neck and immobility of the head.

The following symptoms are peculiar to abscess behind the œsophagus: 1. Severe pain produced even by moderate pressure on the larynx and upper part of the trachea. 2. The circumstance that such pressure produces entire suspension of respiration. 3. Displacement of the larynx forwards and to the right.

In order to be absolutely sure of the existence of this affection, the finger *should be* passed into the throat and quite behind the larynx, when the tumour of the œsophagus, if it exist, will at once be felt.

Chronic enlargement of the tonsils. M. Robert† treats of the results produced by this affection in childhood. The enlargement is never confined to one side, and occasionally it becomes very considerable; in which case it not merely affects the voice, as in the adult, but likewise, by its pressure on the Eustachian tubes, greatly impairs the sense of hearing. It further interferes with the passage of air by forcing up the velum, and hence children thus affected sleep with their mouth open. It also gives rise to a constant dry troublesome cough, imparts a nasal tone to the voice, and owing to air never passing through the nares, the nose does not become properly developed, but remains narrow, and the anterior part of the face thin. Its most serious result, however, is that lateral flattening of the chest, to which attention was first called by Dupuytren. M. Robert thinks that it is produced by the enlarged tonsils preventing the entrance of air, at each inspiration, in sufficient quantity to fill the vacuum in the chest, or to cause a pressure from within the lungs equivalent to the atmospheric pressure without. This deformity of the chest cannot exist without giving rise to dyspnea, palpitation, and the various results of interrupted respiration and circulation: hence children in whom it exists are usually pale, thin and weak.

The symptoms of enlargement of the tonsils usually make their appearance between the sixth month and the second year, and it is probable that the hypertrophy is due to the irritation of dentition. In further proof of this M. Robert mentions that he has seen evolution of the dens sapientiæ in the adult attended with inflammation and hypertrophy of the tonsils.

When once enlarged the hypertrophied tonsils never diminish in size; M. Robert therefore advises their excision. He suggests, moreover, various modes of diminishing the deformity of the chest, and describes different gymnastic exercises appropriate for this purpose.

* Annales d'Obstétrique, Dec. 1842. † Bull. Gén. de Thérapeutique, May and July 1843.

Pneumonia. In their recent work* MM. Rilliet and Barthez have reproduced their former treatise on this subject, with such additions as more extended experience has enabled them to make. Their opinions, however, continue on all important points the same as they expressed in 1838. The writer of this report has made some observations on pneumonia in children.† The results of his post-mortem examinations confirm those of MM. Rilliet and Barthez, except in so far as lobar pneumonia appears to have come under his notice more frequently than it presented itself to those gentlemen. He remarks on the occurrence of idiopathic pneumonia as being more frequent than it would seem to be from the experience of French writers; and shows that it is not, as has been alleged, usually preceded by catarrhal symptoms, but comes on in the greater number of instances wholly independent of them. Its prevalence as well as its fatality are shown to be much greater during the first two years of life than at any subsequent period; while one attack of the disease renders the child prone to its recurrence. An attempt is made to describe its physical signs as well as its general symptoms: the former having hitherto been passed over with too little notice by English writers. The treatment recommended consists in depletion, which, however, is of less avail in the variety of pneumonia that is developed out of catarrh than in the purely idiopathic form. The indications for the employment of antimonial and mercurial preparations are pointed out; and the paper closes with remarks on the general management of the disease.

Hooping-cough. Dr. Aberle‡ has published a dissertation on hooping-cough, which contains, especially in the department of therapeutics, a most elaborate *résumé* of all that has been written on the subject. He embodies in it, likewise, the results of his father's experience during five successive epidemics at Salzburg: but does not throw any new light on the disease. He espouses the opinion that it depends on irritation and inflammation of the nervus vagus, but seems to have met with only one instance in which the appearances found after death betokened its existence. M. Schlesier§ notices the connexion between hooping-cough and measles, and details the particulars of an epidemic at Peitz, which illustrate the mutual relations of the two diseases. He employs his facts to support a theory, that, when the miasm of influenza is superadded to the contagion of measles, a *tertium quid*,—hooping-cough is the result. M. Trousseau‖ notices the fact that an intercurrent febrile attack coming on in the course of hooping-cough always diminishes the disease, sometimes even effects its cure. He observes, too, that this modifying influence does not terminate on the patient's recovery from the fever, but that should the hooping-cough return, after its cessation, it will always be in a milder form. Both M. Jadelot,¶ and MM. Rilliet and Barthez** remark on the error of the opinion that hooping-cough tends to produce emphysema. They join in the observation that the single inspiration, being followed by a succession of rapid, forced expirations, would tend to diminish rather than increase emphysema, while its phenomena are the very opposite to those of suffocative bronchitis, in which the most laborious efforts are made to inspire a quantity of air sufficient for the preservation of life.

Phthisis. The treatise of MM. Rilliet and Barthez††, contains some very valuable observations on pulmonary and bronchial phthisis, but far too long to admit of a complete abstract being given in this Report. They notice that some of the physical signs, on which in the adult, we should lay considerable stress, as betokening the early stage of pulmonary phthisis, are of much less importance in the child: thus, for instance, harsh respiration and prolonged expiration are often met with in the infraclavicular region in children, wholly independent of any morbid state of the lungs. They likewise dwell upon the influence of tuberculated bronchial glands, in imparting an exaggerated character to all the physical signs of tubercle in the lungs. Many pages are devoted to the subject of bronchial phthisis, and their account of its symptoms is much more complete than any which has been published hitherto. No sign, perhaps, is of more importance, as indicating the existence of tubercle in the bronchial

* Lib. cit., tome i, p. 60.
† Report on the Pneumonia of Children, in British and Foreign Medical Review, April 1843.
‡ Tussis Convulsiva, etc.; Vindobonæ, 1843, 8vo.
§ Med. Zeitung, Oct. 4, 1843.
‖ Gaz. Médicale, June 10, 1843.
¶ Gaz. des Hôpitaux, July 25, 1843.
** Lib. cit. tome ii, p. 217.
†† Ibid., tome iii, p. 164.

glands, than the variable character of the results of auscultation, while percussion invariably yields the same result. Sundry modifications of the voice, and a peculiar spasmodic cough, not unlike that of hooping-cough are likewise characteristic of bronchial phthisis.

Diseases of the heart. MM. Rilliet and Barthez* make some observations on endocarditis in childhood; but their remarks apply principally to chronic lesions of the valves. The writer of this Report has endeavoured to call attention† to the occurrence of endocarditis and pericarditis in childhood, as purely idiopathic affections coming on with comparatively trivial symptoms, but tending to produce permanent disease of the organ, and consequently, to lead to all those formidable and distressing symptoms that attend disease of the heart in the adult.

DISEASES OF THE ABDOMINAL VISCERA.

Inflammatory affections of the digestive canal. MM. Rilliet and Barthez‡ have several long articles on this subject. They regard simple *gastritis* as being both unusual, and of minor importance in childhood. Their researches, too, with reference to *ramollissement* of the stomach have led them only to negative results, since they never observed it unattended with other diseases, nor did it in any case constitute the chief lesion. They found it oftenest in cases of meningitis, as also in other cerebral affections, in pneumonia complicated with head symptoms, in the eruptive fevers, and occasionally in inflammatory affections of the abdominal viscera.

They regard remittent fever, or typhoid fever as they term it, as being intimately connected with inflammation of the intestines. They conceive, however, that this inflammation partakes of a specific character, and differs in this respect from the simple enteritis of childhood. The ordinary form of enteritis in the child is that of erythematous inflammation; follicular enteritis is occasionally met with, and the appearances left by it in the intestines differ in no respect from those produced by typhoid fever. Simple follicular enteritis, however, is less serious, is unattended with inflammation of the mesenteric glands, while the symptoms attending it, and the circumstances under which it is developed, are altogether different from those which give rise to typhoid fever. Inflammation of the large intestines is much more frequent, and much more serious than *that of the* small intestines. [The statement of the writers, however, that in one out of every two post-mortem examinations that they made, traces were found of inflammation of the large intestines, must be received with due allowance for the scene of their observations having been the Hôpital des Enfans Malades.] Both the erythematous and the follicular form of inflammation of the large intestines are most severe about the termination of the colon, and are sometimes limited to that situation. The writers consider a classification of the symptoms, according to the part affected, to be almost impracticable, and therefore divide inflammation of the intestines into a simply acute, a typhoid, a dysenteric, and a chronic form; each of which may be primary or secondary. The greater number of their observations refer to the secondary forms; hence their detail of symptoms is of less value than their description of morbid appearances. Hence too, as the writers themselves remark, the disease has been more fatal under their hands than, probably, it might prove under other and more favorable circumstances.

Tabes mesenterica. The common error of regarding tabes mesenterica as a disease of frequent occurrence in childhood, is dwelt on by MM. Rilliet and Barthez.§ They show that various other diseases have been confounded with it, and that the large abdomen, natural to children, has been often regarded as an indication of mesenteric disease. They prove, by statistical data, that though slight tubercular deposit in the mesenteric glands is by no means unusual in tuberculous children, yet an extensive deposit is not met with more frequently than in one out of sixteen cases. Tabes mesenterica, too, appears to be very rare under three years of age, and to be most frequent between the ages of five and ten, beyond which period of life it occurs very seldom. Their remarks on the symptoms are valuable, but lead chiefly to a negative result, since they show that many signs, on which much reliance has been placed, are quite inconclusive, but do not furnish others more trustworthy in their room.

* Lib. cit., t. i, p. 217. † Med. Gazette, Aug. 18, 1843. ‡ Lib. cit., t. i, p. 452.
§ Lib. cit., tome iii, p. 406.

Polypi of the rectum. M. Bourgeois* and M. Gigon† notice the occurrence of polypi of the rectum as being more frequent in children than in adults. They do not resemble polypi in other parts, but are fleshy substances of a bright red colour, destitute of epidermis; their surface constantly oozing with blood, and attached to the intestine by a very delicate membranous pedicle, of a greyish colour, and about the diameter of a small quill. Their point of attachment varies from a few lines to a couple of inches within the rectum. If torn through they sometimes bleed; but this is not always the case. The occasional discharge of blood per anum is the symptom to which they most constantly give rise, and this hemorrhage is sometimes so considerable as to impair the patient's health. They do not by any means invariably protrude beyond the anus during the act of defecation. M. Bourgeois is of opinion, that in some cases nature effects their cure; the action of the sphincter detaching them, after which the pedicle shrivels. Their treatment, however, is very simple. M. Bourgeois is accustomed to twist them off from their pedicle with his fingers; and has seen no bad consequence result from it. M. Gigon, having seen troublesome hemorrhage from the pedicle, ties it, and then returns the polypus within the rectum, and in the course of two or three days it drops off.

Nocturnal incontinence of urine. Professor Romberg‡ proposes a new theory as to the cause of this troublesome infirmity. He denies that it arises from paralysis of the neck of the bladder; but attributes it rather to morbid sensibility of the orifice of the ureters. These spots are always much more sensitive than any other parts of the lining membrane of the bladder, and the irritation of the urine is felt still more keenly when this sensibility is morbidly increased. Reflex action of the musculus detrusor urinæ follows; especially in sleep, when the action of the will is suspended. He proposes, therefore, that children who suffer from this affection should be made to sleep on their belly, by which position the irritation of these two points by the urine is in a great measure avoided, while at the same time demulcents may be given to correct any irritant qualities of the urine.

FEVERS.

The treatise of Dr. Gregory§ on the eruptive fevers, as well as the work of MM. Rilliet and Barthez, contain many valuable observations on measles, scarlatina, and smallpox. The statistical details in Dr. Gregory's book are especially interesting, but it would not be possible to introduce numerical results into this Report.

Measles. Dr. Panck‖ describes a mild, but extensive epidemic of measles, which broke out in May, 1842, in the Orphan House at Moscow. He relates several interesting facts, which show that while the establishment was outside the city, its inmates enjoyed a perfect immunity from epidemic diseases; but that since its removal to a locality in other respects more desirable, but situated within the city, the occurrence of epidemic diseases has been very frequent. The various exanthemata had prevailed extensively in the city during the previous winter; and in May the first case of measles appeared in the Orphan House. The epidemic ran its course in a month, during which time a hundred children, or one third of the inmates of the institution were attacked by it. Ninety-four of the children were pupils of the Orphan House, and only two of them died; a rate of mortality certainly very favorable. In many cases varicella or urticaria preceded the eruption of measles, while in other instances a kind of essera appeared on the hands and face for several hours, or even for some days before the measles showed themselves. When they appeared they were often attended with great drowsiness; but that symptom was not by any means unfavorable. The fever presented somewhat of a gastric type, and stomatitis was very frequent as an attendant on the disease, as well as one of its most frequent sequelæ. Diarrhœa occurred as a sequela in nearly half of the cases; and seemed to partake somewhat of a critical character, coming on in the stage of desquamation when the skin became dry, and the sweats, before very copious, altogether ceased. It was found to be the wisest plan not to attempt to check it; and, indeed, the disease in all its stages required hardly any active interference.

The author of this Report describes¶ an obscure and dangerous affection of the

* Bull. Gén. de Thérap., Oct. 1842, and Nov. 1843. † Annales d'Obstetrique, Avril 1843.
‡ Journal für Kinderkrankheiten, Oct. 1843. § Lectures on the Eruptive Fevers. 8vo, Lond. 1843.
‖ Oppenheim's Zeitschrift, Oct. 1843. ¶ Medical Gazette, Aug. 25, 1843.

air-passages, which he had met with in some instances as a complication of measles, and which has not been often alluded to by former writers. It consisted in the supervention of stomatitis towards the decline of the eruption, associated with a tendency to the formation of false membranes, and the extension of the diphtheritic inflammation to the larynx. In some cases the croupy symptoms to which it gave rise were very obvious, while in other instances its existence was extremely obscure, and masked by the coexistence with it of inflammation of the lungs. It was usually betokened by great drowsiness, difficult deglutition, and alteration of the voice; which were more constant in their occurrence than croupy cough or stridulous breathing. The gums were generally spongy or ulcerated, the tongue was red and raw, and aphthous ulcers existed on its surface or on its edges; and the tonsils and soft palate were red, and coated more or less extensively with false membranes. The depressed state of the system contra-indicated the employment of depletion; and calomel and the other remedies of inflammatory croup were wholly inefficient. The writer expresses an opinion that the employment of local cauterization, as in cases of ordinary diphtheritis, would have been in several of the cases a more appropriate mode of treatment.

Scarlatina. Dr. Graves and Dr. Kennedy* furnish us with very interesting accounts of the scarlet fever recently epidemic in Dublin. The disease, which during the greater part of the present century had been very mild, assumed about the year 1831 a much more serious and fatal character, and continues still to retain it. Some of the cases were associated with severe head symptoms, and convulsions and coma came on at a very early period. In a second variety great irritability of the stomach and bowels existed from the very commencement, dependent, however, on cerebral irritation and congestion, not on any disease of the abdominal viscera. Cases of the third class went on favorably for eight or nine days, when the sore throat returned in an aggravated form, attended with great swelling of the parotid and submaxillary glands, and fever of a typhoid character, which terminated the patient's life. Dr. Kennedy's minute details respecting the affection of the throat are especially interesting. Dr. Watts† has detailed the particulars of a case in which croupy symptoms succeeded to an attack of scarlatina, owing to swelling and ulceration of the mucous membrane of the glottis. Tracheotomy was performed with complete success; but at the date of the report of the case, two months after the operation, respiration was not carried on through the larynx with sufficient freedom to warrant the removal of the canula, and the closure of the wound in the trachea. Dr. Bodenius‡ revives Peart's recommendation of the sesqui-carbonate of ammonia in the treatment of scarlet fever, and attributes to it almost the virtues of a specific. A similar recommendation is made by Dr. Rieken,§ though he forms a somewhat less exaggerated estimate of the virtues of the remedy. M. Godelle‖ advocates the employment of hydrochloric acid and of belladonna, as prophylactics against scarlatina. He attaches greater value to belladonna, but conceives that its preservative power exists only during the time that it is actually employed; and that it does not remove a person's susceptibility to the disease at subsequent times. The experiments of M. Stievenant¶ on its prophylactic virtues do not yield any positive results, but leave the question nearly as far from a solution as before; though, perhaps, they may be regarded as on the whole favorable to the virtues of the drug.

Variola. The anatomy of the smallpox pustule in the various stages of its progress has been studied with great care, and described with great minuteness, by MM. Rilliet and Barthez.** Both they and Dr. Stewardson, of Philadelphia,†† advocate the employment of plasters of mercurial ointment as a means of procuring abortion of the pustules, and consequently preventing pitting. Dr. Stewardson tried this plan extensively, in the Philadelphia hospital, and satisfied himself that it produced a decided effect if the plasters were applied before the third day of the eruption, and were allowed to remain undisturbed until the sixth. He doubts, however, whether

* Graves's Clinical Med., Lect. xxxiv; and Kennedy's Account of the Epidemic of Scarlatina, &c. A fuller account of their observations is contained in Br. & For. Med. Rev., Nos. XXXI & XXXIII.

† Med. Gaz., May 5, 1843.

‡ Ueber das kohlensäure Ammonium, etc.; Heidelberg, 1842.

§ Sur l'Emploi du Carbonate d'Ammoniaque, etc.; Bruxelles, 1843.

‖ Revue Médicale, Jan., Mars, Avril, 1843.

¶ Bull. de l'Acad. Royale de Méd., 15 Fev. 1843.

** Lib. cit., tome ii, p. 450.

†† American Journal of Medical Sciences, Jan. 1843.

the pitting will be always prevented by this measure. In two instances he applied plasters of other than mercurial ointment, but found that they produced no effect; he is of opinion, therefore, that the ointment must act by some specific power, not merely by excluding the air.

The degree of preservative influence exerted by vaccination, and the propriety of revaccination, continue still to be debated on the continent, especially at the Academy of Medicine at Paris, where M. Bousquet and M. G. de Claubry take different sides of the question. M. Bousquet* is of opinion that the vaccine virus becomes weakened by its transmission through numerous individuals, and appeals to the fact that the effects produced by the renovated vaccine virus in 1836 were much severer than those which followed vaccination with the old matter. It is, however, a singular fact that the difference between the vesicle produced by the new virus and that produced by the old is not perceptible till the sixth or seventh day, by which time the preservative power of vaccination has been exerted, as is shown by the circumstance that a second vaccination after that day does not produce any effect. Still the increased frequency of variolous and varioloid affections of late years, and the fact that the greater number of persons in whom smallpox occurs after vaccination are adults, induce M. Bousquet to believe that a weakening of the vaccine virus does result from its repeated transmission through different individuals, and that the preservative power of vaccination does not extend beyond a certain term of years, though its modifying power continues during the whole of life. He inclines, therefore, to the adoption of revaccination. M. G. de Claubry,† on the other hand, insists on the absence of any ratio between the severity of the local effects of vaccination and its preservative power, and regards the symptoms which have followed vaccination practised direct from the cow merely as phenomena attending the naturalization of cowpox in the human subject. When this has once been accomplished, the transmission of the virus through hundreds of individuals in no way impairs its virtues or modifies the character of the eruption which it occasions. In proof of this he mentions that in some places the same virus has been employed for twenty-five, thirty, or even forty years; and yet the character of the vaccine vesicle has continued unchanged during the whole time. No argument for revaccination can be drawn from the occurrence of secondary smallpox, since it occurs even in persons who have had variola once in the natural way; and M. de Claubry states, though on rather slender grounds, that this takes place in one of every sixty-three persons who have been attacked by the natural smallpox. He asserts too that varioloid eruptions were met with in the early days of vaccination as frequently as now, though their variolous nature was not then apprehended; and denies that such eruptions are by any means confined to adults. He finally endeavours to weaken the positive evidence in favour of revaccination, by showing that varicella, varioloid eruptions, and variola have occurred in the Prussian army among persons who had been revaccinated.

The results of recently performed revaccination in the Prussian army, and in a district of Silesia, are contained in the documents referred to below.‡

Dr. Kahlert, of Prague, has made the experiment of passing vaccine lymph from the human subject through the cow, with a view to increase its activity. This experiment, which is the same as M. Bousquet and Mr. Ceely performed, was quite successful. The retro-vaccine lymph thus obtained produced very characteristic vaccine vesicles in some children who were inoculated with it, but without causing any peculiarly severe constitutional disturbance.§

Remittent or typhoid fever. MM. Rilliet and Barthez's work‖ contains an elaborate essay on this disease, founded on the analysis of 111 observations In 29 cases the disease proved fatal; and the appearances found on a post-mortem examination furnish the writers with grounds for their opinion that it is identical with typhoid fever in the adult. The lesions of Peyer's glands, of the solitary glands, and of the mesenteric glands are precisely the same as are met with in the adult, except that the ulcerations are usually smaller, shallower, and less numerous. Ulceration, too, is not the constant result of inflammation of Peyer's glands in childhood, since resolution

* Bulletin de l'Acad. Royale de Médecine, Oct. 15, 1842, and Sept. 30 and Oct. 15, 1843.

† Ib., Sept. 30, and Oct. and Nov. 1843.

‡ Med. Zeitung, Jan. 18, and April 5, 1843.

§ Oest. med. Jahrbücher, June, July, and Aug. 1843.

‖ Lib. cit., tome ii, p. 350.

sometimes takes place, and when it does not the advance of the ulceration is slower and its cicatrization more rapid than in the adult. Typhoid fever occurs most frequently from nine to fourteen years of age; it is less frequent from five to eight; and very unusual in the earlier years of childhood. MM. Rilliet and Barthez describe three forms of it, differing from each other in intensity; the first being very slight, the third very severe, the second intermediate in intensity between the other two. The symptoms of the first form, which they met with in 47 cases, are much the same as those which characterize what is ordinarily called infantile remittent fever in this country. Both this and the other forms, however, present some peculiarities in their symptoms, and run an unfavorable course more frequently than is the case with the remittent fever with which English writers are familiar; a difference probably owing in part to the unfavorable circumstances in which patients are placed in the Hôpital des Enfans at Paris. The writers enlarge on the diagnosis between remittent fever, meningitis, pneumonia, and enteritis; but conclude that when enteritis assumes a typhoid character its distinction from typhoid fever is almost impossible; though the appearances found after death are very different. The remarks on the treatment of the disease do not present anything new, except the recommendation of the sulphate of quinine in the ataxic and adynamic forms: but the whole essay will well repay a careful perusal.

DYSCRASIÆ.

Gangrenes. M. Becquerel* notices the connexion that often exists between pseudomembranous and gangrenous affections in childhood, and illustrates his remarks by the description of an epidemic which prevailed in the year 1841, at the Hôpital des Enfans. The two forms of disease presented close relations to each other; both causing to a great extent the same general symptoms, and one succeeding to or complicating the other. The epidemic croup of 1840, did not altogether cease at the close of that year, and again became epidemic in the ensuing year, and at the same time its complication with gangrenous affections began to occur. M. Becquerel observed seventeen cases of gangrenous angina, twenty cases of croup, and eighteen in which blistered surfaces became gangrenous.

Gangrene of the pharynx was usually preceded by pseudo-membranous angina. Sometimes it coincided with gangrene of blistered surfaces, or of other parts, and in these cases was only a repetition of the morbid process which existed elsewhere. In most cases of gangrene of the pharynx there existed a preternaturally liquid state of the blood, and the symptoms that existed during its progress were such as betokened a generally adynamic condition. It was frequently complicated with pulmonary apoplexy, occasionally with hemorrhage from the bowels. Pneumonia was an unusual complication. It was treated, unavailingly by local cauterization, and by general tonics.

Croup occurred in twenty cases. It often succeeded to a pseudo-membranous angina, or came on as an idiopathic affection. It seldom followed the eruptive fevers. In addition to the ordinary symptoms of croup, phenomena indicative of disturbance of the nervous system often came on towards its close, and pneumonia was frequent. All the cases terminated fatally; tracheotomy having been practised nine times without success.

Gangrene of blistered surfaces took place in the course of very various diseases; but mostly of such as presented something of an adynamic character. It often came on in the course of measles. False membranes usually formed over the blistered surface; which next became gangrenous, but the patients died under symptoms of great exhaustion before the eschar became detached. Local treatment and general tonics invariably failed of success.

MM. Rilliet and Barthez† give a full description of the different forms of gangrene which occur in childhood, and regard them all, not as mere local maladies which subsequently react on the constitution, but as the result of a generally diseased state of the whole organism. M. Boudet‡ in the course of some remarks on gangrene of the lung in childhood, observes that spontaneous gangrenes in children, appear invariably to develop themselves under the influence of causes acting on the entire economy. He conceives the proximate cause of all these affections to be an altered state of the

* Gazette Médicale, Oct. 28 and Nov. 4, 11, 18, 1843. † Lib. cit., tome ii, p. 98.
‡ Archives Gén. de Médecine, Août et Sept. 1843.

blood, such as succeeds scurvy, measles, and scarlatina, and which is characterized during life by hemorrhage, purpurous spots, ecchymoses, &c. The lesion of the blood, consists in his opinion in a diminution of its fibrin, and an excess of alkali. This supposition, however, rests on but a slender basis; partly on the statement of MM. Andral and Gavarret, that the fibrin of the blood is diminished, and its fluidity increased in the exanthemata; partly on the result of his own investigations. He examined the blood carefully four times: twice it was entirely fluid in the heart and vessels, twice it was diffluent, and scarcely coagulated at all; and in the remaining cases, ten in number, it was much less firmly coagulated than natural.

M. Huguier* relates a case of that rare occurrence, *spontaneous gangrene of the surface* in a child aged 7½ years. The previous history of the patient was unknown, beyond his own statement, that two months before he had had a very violent cold. When received into the Charité, the tips of all the fingers of the left hand were black, and those of the right hand had begun to show a darkish colour. All the toes of the left foot were quite black, the middle toe had dropped off, and the tips of the toes of the right foot were also black. There was neither pain nor redness in the course of the arteries, nor were they less yielding and elastic than natural. The child was bled twice, and took opium during his stay in the hospital; the duration of which, as well as many other points of importance in the case, are not stated. He left the hospital well, having lost all the toes of both feet, the fingers of the left hand, and the whole of the right hand, as also the skin at the tip of the nose, at the prominence of the cheek-bones, the chin, and the edges of the ears.

Tubercle and scrofula. MM. Rilliet and Barthez† contend earnestly for the identity of the tuberculous and scrofulous diseases; and they assert, that having examined the bodies of a large number of scrofulous children at the Hôpital St. Louis, they met with no instance in which tubercular deposits did not exist in some part or other. They regard many affections, usually termed scrofulous, such as ophthalmia, caries, eczema, &c., as being of a secondary nature, accidentally complicating the original scrofulous, or tuberculous habit, but not essentially scrofulous in their nature. They propose to banish the name, scrofula, from medical nomenclature, as being vague, and likely to mislead, and to substitute for it the term tuberculization. M. Bredow,‡ of St. Petersburgh, takes a similar view of the identity of the two diseases; he proposes, however, to retain the word scrofula, to designate tuberculous disorganization of the lymphatic glands, and to employ the name, tubercle and tuberculous disease for the same affection existing in other organs. The interesting researches of MM. Rilliet and Barthez into the anatomy of tubercle, belong properly to the domain of pathological anatomy. They have directed their attention to some other points, however, which may with propriety be mentioned here. The extreme frequency of tuberculous disease in childhood appears from the fact, that it existed in a more or less advanced state, in some part or other, in 314 out of 525 children, of whom they made a post-mortem examination. With reference to the influence of sex and age on its production, they find that it is most frequent from 6 to 10½ years of age, then from 11 to 15, next from 2 to 5, and lastly from 1 to 2½; and they support this statement as well as their other assertions by statistical data. The female sex is, on the whole, more liable to it than the male, though this liability is not the same at all ages, for from 1 to 2½ years of age more cases are met with in the male; from 3 to 5 there is a slight excess among females, and from 6 to 10 the two sexes seem equally liable to the disease, but from 11 to 15, that is to say, at the time when puberty approaches, female children suffer much more from it than males. It appears, too, that tuberculous deposit is most frequently met with only in a slight degree from 3 years of age to 5½; that a moderately abundant deposit is oftenest found from 1 to 2, and next in frequency from 3 to 5; and that very abundant deposit is much oftener discovered from 6 to 15, than from 1 to 5 years of age. Children under 1 year old, did not come under their notice.

They give an interesting table of the comparative frequency of tuberculous deposit in different organs in 314 children between the ages 1 and 15:

* Clinique des Hôpitaux des Enfans, Dec. 1842.

† Lib. cit., tome iii, pp. 1-163.

‡ Ueber die Scrofelsucht, 8vo; Berlin, 1843.

Tubercle was present in the		Tubercle was present in the	
Lungs . . .	in 265 cases.	Liver . . .	in 71 cases.
Bronchial Glands .	,, 219 ,,	Large Intestines .	,, 60 ,,
Mesenteric Glands .	,, 144 ,,	Membranes of the Brain	,, 52 ,,
Small Intestines .	,, 134 ,,	Kidneys . .	,, 49 ,,
Pleura . . .	,, 109 ,,	Brain . . .	,, 37 ,,
Spleen . .	,, 107 ,,	Stomach . .	,, 21 ,,
Peritoneum . .	,, 86 ,,	Pericardium, Heart .	,, 10 ,,

The work of M. Bredow* is an extremely well-executed compendium on the subject of scrofula, and contains many valuable practical suggestions derived from his extensive experience as physician to the Imperial Manufactory of Alexandrowsk, near St. Petersburgh.

Rickets. Dr. Elsässer† opposes the commonly received opinion, that this disease does not occur during infantile life; and describes a peculiar affection of the skull in early infancy, which he believes to be the result of rickets. It consists in softening of the cranial bones, attended with increase of vascularity and alteration of their texture, which becomes spongy, rough, and porous, owing to a diminution of their earthy constituents, and disintegration of their tissue. Under the microscope the canaliculi of the bones are seen to be dilated, and communicate freely with each other; —conditions that have been observed to follow from the action of rickets on other bones. To this affection he gives the name of *craniotabes*, or *the soft occiput*, from that yielding of the bones under pressure which constitutes one of its most striking symptoms. A great part of infantile life being spent in the recumbent posture, the softened and yielding occiput has to support the pressure of the contents of the cranium for many hours daily. This circumstance would of itself produce some unpleasant effects, which are aggravated by the tendency of the pulsation of the brain, within the cranium, and the pressure of the pillow on which the infant reposes, without the cranium, to attenuate the softened bone at those places where the convolutions of the brain are most prominent. Sometimes the bony matter is completely absorbed in various places, the holes in the skull being closed merely by the dura mater and pericardium. This condition is not the result of originally defective ossification, for it is not met with in the fœtus; and, moreover, the situation of the openings in the skull does not correspond with those which would be produced by any suspension of the process of ossification. It is not found either immediately after birth, but begins about the third month, or somewhat later; and the circumstance that the attenuated and perforated spots are found only at the occiput or the occipital end of the parietal bones, though the whole cranium is softer than natural, proves that it is the result of pressure exerted in the way already described. It is but natural that, the protecting case of the brain being thus weakened and thinned, the organ itself should suffer from various external agents. Accordingly, cerebral irritation and congestion are produced, and show themselves in convulsive seizures of various kinds, and frequently in attacks closely resembling laryngismus stridulus. So far, too, is the affection from being one of slight moment, that half of those who are affected by it die; while its occurrence is so frequent that Dr. Elsässer has met with it forty times, in the course of five years' practice, in a small country town. The appropriate treatment consists in the employment of tonics, among which iron bears the chief place; and in the adoption of various precautions to prevent or, at least, to diminish pressure on the occiput. [Notwithstanding Dr. Elsässer's assertion to the contrary, a suspicion may be entertained that he has been misled as to the frequency of this affection; or that endemic causes or some local peculiarities have tended to render it very prevalent in the town where he practises. For the last six months, since his work came under the notice of the writer of this Report, he has carefully examined the heads of infants who came under his care at the Infirmary for Children, and has very rarely found any such yielding of the bones as Dr. Elsässer frequently met with, except just in the neighbourhood of the anterior fontanelle. Laryngismus stridulus, too, has not come under the writer's notice more than two or three times a year, during the past five years, notwithstanding the large number of children who are brought to the Institution.]

* Ueber die Scrofelsucht, 8vo; Berlin, 1843.

† Der weiche Hinterkopf, etc, 8vo; Stuttgart und Tübingen, 1843. The present Number of this Review contains a more extended analysis of Dr. Elsässer's observations.

REPORT ON THE PRESENT STATE OF KNOWLEDGE OF THE NATURE OF INFLAMMATION.

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When a part of the body, visible externally, is the seat of inflammation, the observer perceives it to be preternaturally red, swollen, and preternaturally hot; the patient, moreover, says that he feels it hot and painful. The conditions on which these symptoms depend are, on the whole, sufficiently obvious; but the nature of the process which leads to them—in other words THE THEORY OF INFLAMMATION—is very obscure, and has always been, and still is, an object of much debate and inquiry with pathologists.

As it is microscopical parts which are immediately concerned in the inflammatory process, it is only since pathologists became acquainted, by means of the microscope, with those parts and their mode of action, that any real advance has been made in the inquiry. The parts referred to are principally the corpuscles of the blood and the capillary vessels. In entering, therefore, on the task of reporting on the theory of inflammation, it will be useful to premise the following points regarding the blood and its circulation in the capillaries in the healthy state:

I. BLOOD IN THE HEALTHY STATE.

§ 1. In *human blood*, after being drawn, the red corpuscles aggregate together like coins in rolls. This aggregation takes place in the course of half a minute or so after the blood is drawn, when the blood is in a healthy state, with its plasma of ordinary thickness; when, on the contrary, the blood is not in the healthy state, but has a more inspissated plasma, the aggregation of the red corpuscles is so rapid that it is found to have already taken place by the time the blood can be transferred to the microscope and examined.

§ 2. The admixture of certain reagents with the blood influences the aggregation. Some promote it, others prevent it; those which promote it, if anything, give rise to endosmose rather than to exosmose; among those which prevent it are found as well such as give rise to exosmose as those which give rise to endosmose. It appears to be viscidity of the fluid (a certain proportion of salts being at the same time dissolved in it,) in which they are suspended, which especially promotes, though is not the cause of, the tendency to the aggregation of the red corpuscles.

§ 3. In the newly-drawn *blood of the frog* a sort of aggregation of the red corpuscles is also observed; but instead of having their surfaces fully applied to each other, and being raised up on edge, as in human blood, the red corpuscles, for the most part, lie flat, and merely partially overlap each other, like the coins of a roll which has been thrown loosely down. The admixture of mucilage of gum with a little common salt in solution, which, in human blood, much augments though in an irregular and confused manner, the aggregation of the red corpuscles, has comparatively little effect on the blood of the frog. Henle states that white of egg causes the red corpuscles of frog's blood to aggregate into heaps; but this does not appear to be to any greater amount than when mucilage of gum, with a little salt in solution, is the reagent employed.

§ 4. Though the red corpuscles of the blood of the frog have less disposition to aggregate than those of human blood, the colourless corpuscles appear to have more.

§ 5. The red corpuscles of the blood of the frog, as seen circulating within the vessels of the web, do not show the nucleus, or that very indistinctly; but when examined after being drawn from the body, the presence of the nucleus is sufficiently evident. The immediate cause of this difference appears to be, that in the former case the red corpuscles are more distended, in the latter more collapsed. For the reason that they are more collapsed after being drawn, the red corpuscles also appear redder. This change in the red corpuscles is coincident with the occurrence of the tendency to aggregate.

II. CAPILLARY CIRCULATION IN THE HEALTHY STATE.

§ 6. As the capillary circulation cannot be observed in the human body, reference is made to observations on the web of the frog's foot for what is necessary to be said on the subject, as a preliminary to inquiries into the action of the blood and of the capillaries in inflammation. In pursuing these latter inquiries, recourse must also be still had to observations on the web of the frog's foot. And it was in reference to this necessity to have recourse to observations on the frog, that the above remarks regarding its blood in comparison with that of man were made.

§ 7. When the circulation in the web of the hind foot of a frog is carefully observed under the microscope, the colourless corpuscles of the blood are seen, especially if the velocity of the stream be diminished by pressure on the limb, for example, accumulated on the inner surface of the walls of the vessels, along which they slide or roll over and over very slowly in comparison with the red corpuscles which occupy the axis of the stream, and move directly onwards.

§ 8. From these differences in the position, and in the mode and rapidity of progression of the two kinds of corpuscles of the blood, it would appear that there exists some sort of attraction between the colourless corpuscles and the walls of the vessels, but an absence of attraction, if not a repulsion, between the red corpuscles and these walls, as also between the red and colourless corpuscles.

§ 9. Though the red corpuscles keep together in the axis of the stream, there is not apparent among them any tendency to aggregate, like what is observed when the blood is drawn from the body.

§ 10. Through the very smallest capillaries, besides plasma and a few colourless corpuscles one after the other, a red corpuscle is only now and then observed to pass—a circumstance which is to be explained, not by the too great size of the red corpuscles, (for they can readily accommodate themselves to vessels of a diameter less than their own,) but by a reference to the circumstance of an absence of attraction or the existence of a positive repulsion between the red corpuscles and the walls of the vessels. The plasma and colourless corpuscles, by virtue of their attraction for the walls of the vessels, readily enter very small ones, but when a red corpuscle would enter, it comes within the sphere of the repulsion of the walls of the vessels, and is as it were warded off. And when it does happen that a red corpuscle enters one of the smallest capillaries, it appears to be only by being actually forced in by accidental pressure from behind.

III. PHENOMENA ATTENDING THE FIRST STEPS OF THE INFLAMMATORY PROCESS, VISIBLE BY THE MICROSCOPE.

§ 11. To proceed now with the inquiry into the nature of the inflammatory process.

If the web of the frog's hind foot, displayed under the microscope, be irritated, mechanically or chemically, an opportunity is obtained of witnessing what is microscopically observable of the first steps of the traumatic inflammatory process which is excited.

§ 12. Very soon, then, after the web of the frog's foot, thus displayed under the microscope, has been mechanically or chemically irritated, accumulation and stagnation of the blood in the capillaries, including the terminations of the arteries and radicles of the veins of the part, is observed to take place; but amidst the obstructed vessels a few here and there may still be seen pervious, and through them the stream of blood is very rapid. The accumulation and stagnation of the blood in the small vessels is always preceded by a retardation of its flow—this retardation of the flow of blood, having or not having been preceded by the opposite condition of an accelerated flow.

§ 13. The acceleration, when it does occur, and the retardation of the flow of blood are coincident with changes in the width of the vessels—the former with constriction, the latter with dilatation. Omitting from further consideration the accelerated flow of blood, and the constricted state of the vessels with which it is coincident, as not constant, let the *behaviour of the blood during the retardation of its flow and at the time of its stagnation* be inquired into.

§ 14. *a. Colourless corpuscles.* During the retarded flow of blood immediately preceding stagnation, an accumulation of colourless corpuscles is observed to take place on the inner surface of the walls of the dilated small vessels, similar to what occurs in the healthy state when the velocity of the stream of blood is diminished. (§ 7.)

§ 15. *b. Red corpuscles.* While the accumulated colourless corpuscles may have even become stagnant on the walls of the vessels, the red corpuscles, though in increased quantity, in proportion to the plasma, still continue to float on, but more and more slowly, until complete stagnation ensues. They are somewhat more collapsed than natural; hence they appear redder, and their nucleus is less indistinctly seen—a change similar to what takes place in the red corpuscles of newly-drawn blood. (§ 5.)

§ 16. The red corpuscles appear to be the agents principally concerned in the stagnation of the blood. The mode in which this is seen to be brought about was, for the sake of contrast with the phenomena attending the circulation in the capillaries in the natural state, briefly described on a former occasion in this Review. (Oct. 1842.) It was there stated to be by the red corpuscles agglomerating together, and applying themselves here and there flat against the walls of the vessels, and adhering to them; whilst other red corpuscles applied themselves to those already adherent.

§ 17. The same phenomena had been described by others before; and Emmert* and Vogel,† in their publications of about the same date, have given similar but more detailed accounts of the mode in which the stagnation of the blood is seen to take place.

According to Emmert (ut supra, pp. 72-84,) the colour of the red corpuscles becomes somewhat deeper, whence they appear individually less transparent. The surface appears less smooth, the inequalities of the edges can be perceived with peculiar distinctness. The corpuscles at the same time acquire the property of remaining adherent to each other and to the walls of the vessels when they come into contact with them. If attention be directed to the streams of blood in the radicles of the veins which have just come out from the dilated capillary network, the adhesion of individual blood-corpuscles to each other, is still often to be seen. Sometimes they adhere to each other more with their points, so long as they lie behind each other; sometimes it is the lateral edges or some parts of the surfaces which are agglutinated.

Vogel's account is as follows: (pp. 315-26.)

When the flow of blood becomes retarded and oscillations commence, the blood-corpuscles apply themselves more to each other; the individual corpuscles may, indeed, be still perfectly distinguished from each other, but they touch each other, and are, in the smaller capillaries, often pressed close together by their surfaces, in the manner of rolls of coin. The space next the walls of the vessels appears to be merely filled with plasma. In complete stagnation of the blood, this space disappears, the interior of the vessel is completely filled with blood-corpuscles, which are closely aggregated together, and form an apparently homogeneous indistinctly granulous mass, in which individual blood-corpuscles can scarcely be distinguished. But this fusion is merely apparent; for if the blood be evacuated by opening the vessels, the individual corpuscles again appear quite distinctly.

§ 18. In reference to the account in this Review for October, 1842, above referred to, of the mode of stagnation of the blood in the capillaries of the web of the frog's foot, when irritated mechanically or chemically, Dr. Williams,‡ after noticing what the author had said of the aggregation of the red corpuscles of human blood, newly drawn during inflammation, observes, "But Mr. W. Jones is premature in assuming that a similar aggregation of the blood-corpuscles occurs within the blood-vessels, and is the cause of obstruction in the capillaries in inflammation and other cases of impeded circulation. No such cohesion is seen in

* Beiträge zur Pathologie und Therapie, Heft 1; Bern, 1842.

† Wagner's Handwörterbuch der Physiologie, Art. 'Entzündung.' ‡ Principles of Med., p. 89, § 109.

the large vessels of a frog's web, when the motion of the blood is arrested by pressure on a vein; and although the blood does coagulate (?) in some of the vessels of an inflamed part, this will be hereafter shown to begin with the colourless rather than with the red particles."

§ 19. Leaving for after-consideration the latter proposition, the author of this Report would remark, that, considering the place and mode in which the above allegation is made, that he "assumes" that an aggregation of the blood-corpuscles similar to that presented by buffy blood occurs within the blood-vessels, and is the cause of obstruction in the capillaries in inflammation, one, confiding in the accuracy of Dr. Williams, would suppose that the author of this Report made the imputed assumption because the red corpuscles of human blood drawn from a person labouring under acute inflammation aggregate more rapidly and closely than in blood from a healthy person. How much soever, the author of this Report believes, as will be seen below, that the greatly increased tendency of the red corpuscles of buffy blood to aggregate would promote the action of the exciting cause of inflammatory stasis, it was never for a moment his opinion that such increased tendency was a necessary condition for inflammatory stasis, knowing that this may arise from a slight injury, and when the mass of blood is still quite healthy.

§ 20. But suppose Dr. Williams did not mean to impute any such opinion, but merely intended to say that the author of this Report "assumed" that an aggregation of the blood-corpuscles occurs within the blood-vessels, similar to that which healthy blood newly drawn presents, and is the cause of obstruction in the capillaries in inflammation, the author begs to observe again, that how much soever he believes it, as will be seen below, he did not, in the paper referred to, either state it or assume it. He merely stated, without any particular reference to the aggregation of the red corpuscles of human blood, what he had *observed*, what others have observed, and what Dr. Williams himself appears to have *seen*, though he has not sufficiently reflected on it, in regard to the mode in which stasis takes place in the capillaries of the web of the frog's foot, in consequence of mechanical or chemical irritation, and contrasted it with the phenomena attending the circulation in the capillaries in the natural state. Further, if the author did not either state or assume any such thing in regard to inflammation, much less did he do so in regard to "other cases of impeded circulation." Had the author stated or assumed this, Dr. Williams would certainly have been correct in bringing forward, in refutation of it, the argument he does. But when Dr. Williams makes use of the argument referred to in refutation of the other "assumption" which he imputes to the author, viz., that aggregation of the red corpuscles within the blood-vessels is the cause of obstruction in inflammation, he errs very greatly. The condition of blood arrested in the capillaries by pressure on a vein is surely quite different from that of blood in the relaxed and dilated vessels at the time of inflammatory congestion, or of blood after it has been drawn from the body.

But to return from this digression:

§ 21. *c. Plasma.* This, it has been said, (§ 15,) becomes proportionally diminished in quantity in consequence of the accumulation of the red corpuscles. How far this proportional diminution in the quantity of plasma is owing to *its draining* away from among the stagnating red corpuscles into the veins, and how much to the serous exudation through the walls of the vessels which occurs about the time of stagnation, will form a subject of inquiry further on.

IV. EXPLANATION OF THE MICROSCOPICALLY-VISIBLE PHENOMENA ATTENDING THE FIRST STEPS OF THE INFLAMMATORY PROCESS.

§ 22. Retardation of the flow of blood in the small vessels, and that coincident with dilatation of their caliber, and at last accumulation and stagnation of the blood-corpuscles in the vessels thus constitute the first phenomena constantly appreciable by the microscope in the inflammatory process, as observed in the frog. The *macroscopical* phenomena of inflammation in man seem to warrant the inference that the *microscopical* ones are essentially the same in him as in

the frog. The explanation of these phenomena, therefore—their sequence and relations—is justly considered the key of the whole theory of inflammation.

§ 23. Is dilatation of the small vessels primary, and retardation of the flow of blood in them secondary, or is the contrary the case? That dilatation is primary and retardation of the flow of blood the necessary physical result of the preceding dilatation, is maintained by most recent authors. And though they have good reason on their side, it is to be observed that, considering the peculiar vital endowments of the blood and the vessels, the fact of the case is not so unconditional as it might seem at first to be, judging merely from the flow of non-vital fluids in inert tubes. For, as accumulation and, lastly, stagnation of the blood soon supervene on the retarded flow, and as that accumulation and stagnation must, as will be shown, acknowledge some other cause than dilatation of the vessels, this retarded flow might be attributed, as is done by Vogel, to the commencing operation of that cause, whatever it is, which determines the accumulation and stagnation; and the dilatation itself to distension from the accumulated blood, and therefore secondary. To this it is to be replied, however, that dilatation of the vessels from distension by accumulated blood would be subsequent, by an appreciable interval, to the retardation of the flow of blood, which it is not; for there is already dilatation with coincident retardation, before accumulation has taken place to an extent sufficient to produce distension.

§ 24. The opinion, therefore, above stated as that entertained by most authors is to be considered just, but only so far as it goes, for it does not embrace the whole truth. The truth appears to be this:—Dilatation is primary, but the retardation of the flow of blood is in part only the physical effect of it, being greater than the dilatation is sufficient physically to account for. The other cause in operation is the same as that which at last determines the accumulation and stagnation of the blood, as will be explained below. By the accumulation of the blood, however, there is a secondary dilatation of the vessels—one from distension, but which more particularly implicates the capillaries—perhaps is the sole dilatation of which the capillaries proper are the seat, as will immediately be shown. This view is much the same as that entertained by Vogel in regard to certain cases only, viz., those in which common congestion passes into inflammatory congestion. It being Vogel's opinion that it is in common congestion only that dilatation of the vessels is primary, and that in inflammatory congestion it is from distension alone, and altogether secondary. But there do not appear to be any grounds for this opinion.

§ 25. Having thus determined that there is primary dilatation of the vessels, the next subject of inquiry is the nature of the dilatation. Does dilatation depend on an active state of the walls of the vessels, or on a state of relaxation? The prejudice that inflammation is a state of increased action of *all* the parts concerned, which has led some (justly believing that constriction is the active state of the vessels) to maintain that the vessels are constricted in inflammation, has led others (knowing that the vessels are really dilated in inflammation) to maintain that their dilatation is an active state. This view was most strenuously maintained by the late Professor Macartney of Dublin, and more recently it has been advocated by Lotze. (Allg. Pathologie und Therapie als mecanische Naturwissenschaften, Leipzig, 1842, pp. 277-368.) Dr. Copland maintains that in sthenic inflammation the vessels are actively dilated, and that a larger column of blood circulates in them with increased velocity. In asthenic inflammation Dr. Copland admits the dilatation of the vessels to be owing to relaxation, and that the flow of blood in them is retarded or arrested. John Hunter, while he admitted relaxation of the muscular powers of the walls of the vessels, spoke of the dilatation of the vessels as if it were an active state, believing it to be to a greater extent than could be permitted without force by the elasticity of the vessels. This, however, was evidently a mistake on the part of Hunter, produced by clinging to the prejudice of increased action. Eisenmann (Haeser's Archiv, 1841, pp. 239-349), and Heine (Physio-pathologische Studien; Stuttgardt und Tübingen, 1842, p. 156), again justly believing that constriction is the active state of the vessels, and at the same time aware that in inflammation there is

dilatation of vessels, have sought to reconcile this fact with the prejudice that inflammation is a state of increased action, by supposing, as Haller had done, the existence of spasmodic contraction in one part of the vessels and dilatation from distension immediately behind; Eisenmann believing the distended part of the vessel still in an active state, but its contractile force overcome by the distension from within; Heine again supposing that the distended part is relaxed like the part of intestine behind the contracting part.

Farther details of these and such views it is unnecessary here to give, as the arguments brought forward in their support are too fallacious—too inconsistent with established physiological principles, or as they are opposed to the results of direct observation.

§ 26. Animal physiology recognizes no other motor agent than contractile fibre, i. e., a fibre capable, under certain conditions, of becoming shortened in the direction of its length, and that with force, but when no longer under these conditions readily resuming its former length. As therefore the walls of vessels are formed of circular contractile fibres, diminution or constriction of caliber must be the only result of their active state, and dilatation of their caliber the result of their relaxation or passive state.

§ 27. To this add the results of the direct observation among others, of Alison: —"In a series of observations made in Edinburgh," says Alison (Outlines of Pathology and Practice of Medicine, pp. 116-117), "on the arteries leading to inflamed limbs in horses at different parts of their course, and at different periods of the inflammation, it always appeared that these vessels possessed less of the only vital power which experiments authorize us to ascribe to them; that they had less power to propel their contents than those of the opposite sound limbs.*

§ 28. As to the small arteries, the dilatation of their caliber, as observed taking place in the web of the frog's foot under the microscope, one would think could suggest no other interpretation than that it is an analogous state of relaxation to what is more unequivocally appreciable in the larger arteries, whilst diminution of their caliber is a state of activity of their walls. But, according to Lotze, it is a prejudice to admit, from analogy, that the walls of the fine vessels must contract like the larger in the state of activity. He is of opinion that it is not unscientific to view in the one a condensation, in the other a separation of the molecules, as the consequence of nervous activity. Henle, in objecting to this, well remarks, "Whoever has himself made researches in any department of natural science, will not estimate lightly proof from analogy. Error is indeed possible, and a conclusion from analogy therefore remains an hypothesis until observation has confirmed it. But it is somewhat different to distrust such an hypothesis, or as Lotze does, to set up an hypothesis which is directly opposed to analogy." ('Bericht,' p. 97.)

§ 29. It is to be concluded then, as first suggested by Vacca, and in corroboration of which microscopical observations were first adduced by Wilson Philip, and now admitted by most authors on the subject, that the dilatation of the arteries in inflammation is a state of relaxation or paralysis, not of activity. Having come to this conclusion the next inquiry is as to whether the capillaries and venous radicles have contractile coats, and are therefore subject to dilatation from relaxation.

§ 30. Though constriction and dilatation of the capillaries and radicles of the veins are said to take place as well as constriction and dilatation of the small arteries, it is proper to observe that it is the latter alone which are seen under the microscope to be the seat of such marked constriction and dilatation of their caliber, as appear to be owing to an action of their coats of the same nature as vital contractility. So marked is the difference in this respect between the small arteries and the capillaries, that whilst the caliber of the artery may be observed to become almost wholly obliterated for the time by contraction of its walls throughout the whole

* The increased force with which the arteries leading to an inflamed part throb, thus cannot be owing to increased action. It is owing, as pointed out by Dr. Billing and Mr. Davies, to this, that, being relaxed, they yield more readily to the impulse of the blood propelled into them at each stroke of the heart.

extent of the part of the vessel under observation, or at intervals presenting the appearance of a series of strictures, a varicose appearance, as Wedemeyer expresses it, the capillaries into which it opens continue to preserve their caliber little or not at all changed.

§ 31. It is to be remarked, in opposition to this, that Emmert, who formerly denied the contractility of the walls of the capillaries, has recently admitted it, and estimated the diminution of their caliber by the contraction which, from moderate irritation, always precedes dilatation, to amount to one quarter or one fifth of the diameter of the vessels. This amount of constriction of the capillaries is very small in comparison with that presented by the arteries. The dilatation, again, of the capillaries succeeding the constriction, is stated by Emmert to be as much as one third to one half and more. The radicles of the veins do not present any greater diminution of caliber than the capillaries, though, like them, they admit of great dilatation.

§ 32. Not being satisfied that the capillaries and radicles of the veins have contractile walls, and admit, therefore, of primary dilatation from relaxation, the author of this Report is disposed to believe that dilatation of the capillaries and radicles of the veins is secondary to the retardation of the flow of blood in the arteries, and is owing to distension from the accumulating blood. The constriction of caliber which the capillaries are said to present, though to a small amount, may be ascribed to elastic reaction of their walls, as it exists at the time when the arteries are constricted and when the flow of blood is accelerated and not impeded by any tendency of the red corpuscles to accumulate. It is left undetermined whether rarefaction or condensation of the parenchyma in which the capillaries are distributed have any influence, as Vogel thinks, on their constriction or dilatation.

§ 33. It being thus certain, to use the words of Dr. Alison,* that during the whole time when inflammation and effusion consequent on it are most evidently going on, the condition of all the vessels (possessing contractile walls) leading to and passing through the inflamed part, is one not of contraction but of relaxation; the question before us, viz., whether the phenomena of inflammation can be explained by the alteration of the *vital powers of the vessels* in which the blood moves, is, Dr. Alison thinks, narrowed to this:— Does that state of relaxation afford a sufficient explanation of the changes which take place in the inflamed parts?

§ 34. The effect of relaxation of the vessels is dilatation, and the effect of dilatation is retardation of the flow of blood; though, as has been said, and as will be shown below, the whole amount of the retardation which takes place is not alone the direct physical effect of the dilatation. But putting this question aside for the present, let it be inquired what effect the retardation of the flow of blood has in producing accumulation and stagnation of the corpuscles.

1st. *Accumulation and stagnation of colourless corpuscles.*

§ 35. The colourless corpuscles which accumulate on the inner surface of the walls of the dilated vessels during the retardation of the flow of blood, have been alleged by Dr. Williams to be actually new formations occurring at the moment. Having directed attention particularly to this point, the author of this Report can venture to maintain that the colourless corpuscles which are observed to accumulate on the walls of the vessels are no new formations called forth at the moment; but that, as stated on a former occasion in this Review, they already exist in the blood. That when the velocity of the stream of blood is great, the colourless are mingled and carried along with the red corpuscles, but when the velocity of the stream is diminished from any cause—whether one of a temporary nature or that leading to inflammatory congestion—the colourless corpuscles become extricated from among the red ones and come into contact with the walls of the vessels, where, rolling slowly along or actually remaining stagnant, they accumulate in great numbers.

* Ut supra, p. 115.

The same view of the matter is taken by Emmert.*

2d. *Accumulation and stagnation of red corpuscles.*

§ 36. Has the retardation of the flow of blood any influence in determining the accumulation and stagnation of the red corpuscles? In other words, does retardation of the flow of blood lead to accumulation and stagnation?

The mere retardation of the flow of blood does not, as in the case of the colourless corpuscles, operate in determining the accumulation and stagnation of the red corpuscles. Whilst the colourless corpuscles always accumulate and stagnate, when from any cause retardation of the flow of blood takes place, (being, on account of their want of attraction for the red ones, extricated from among them, and by virtue of their attraction for the wall of the vessels brought into contact with it,) the red corpuscles having, under ordinary circumstances, no such attraction for the walls of the vessels, pass on along with the plasma.

§ 37. Accumulation and stagnation of red corpuscles not being, as is the case with the colourless corpuscles, determined by a retardation of the flow of blood in the vessels, how are their accumulation and stagnation determined? Has the accumulation of colourless corpuscles itself, which results from retardation of the flow of blood, any share in determining the accumulation and stagnation of the red corpuscles?

Dr. Williams conceives that the accumulation of colourless corpuscles, or, as he expresses it, the "increased production" of colourless corpuscles and their remarkable disposition to adhere to the walls of the vessels and one another, to be the chief cause of obstruction of the circulation in an inflamed part, and that by entangling the red corpuscles among them.

§ 38. This opinion is not more warranted by what is really to be observed by means of the microscope than is the view that the accumulation of colourless corpuscles is owing to an instantaneous increased production of them. At the time of stagnation of the red corpuscles there may be not more colourless ones than may often be seen at a time when the circulation is going on without any tendency of the blood to stagnate. Dr. Williams's own figure, p. 213, shows this. Besides, Dr. Williams has observed how the red corpuscles can accommodate themselves in order to glide past obstructions,—a circumstance which shows how little likely they are, when *otherwise unaffected by any change*, to be entangled by the colourless corpuscles or any other impediment not presenting a complete barrier.

§ 39. This explanation given by Dr. Williams, of the immediate cause of stagnation of the blood in the small vessels of an inflamed part, is a mere mechanical one; and though of a more refined character than most other such explanations, it is not in reality better founded. For a very able refutation of any explanation of the phenomena of inflammation on simply mechanical or chemical principles, or by any combination of the two, reference may be made to Alison's 'Outlines of Pathology and Practice of Medicine,' p. 108; and for a refutation of the latest explanation of the kind which has appeared on the continent, viz., that of Dubois, reference may be made to Henle's Report.†

§ 40. Do relaxation and dilatation of the vessels, with retardation of the flow of blood, considered by themselves, act in any way in determining stagnation of the blood?

Henle‡ thinks they do and that in the following manner:

As a physical consequence of dilatation of the vessels there takes place a retarded flow of blood. This retarded flow of blood, together with the relaxation and dilatation of the vessels, favours the exudation of serum; the consequence of which is, that the plasma of the blood in the part becomes inspissated by a preponderance of protein matter over the salts. This inspissation of the plasma determines endosmotic changes in the red corpuscles, in consequence of which they are disposed to aggregate.

§ 41. Henle, at first, gave this explanation of the immediate cause of stagnation

* Ut supra, p. 48.

† Bericht über die Arbeiten im Gebiet der rationellen Pathologie seit Anfang des Jahres 1839. p. 45.

‡ Ut supra, p. 130.

of the blood as *possible* only; but he now thinks that the appearances of the red corpuscles at the time of stagnation (§§ 5-15-17) being such as indicate the action of an inspissated plasma, render the opinion more probable.

§ 42. The author of this Report cannot agree with Henle, that relaxation and dilatation of the vessels are the first step to stagnation, merely by virtue of their allowing a retardation of the flow of blood in the affected vessels and a copious exudation of serum from them, so that the plasma becomes inspissated,—inspissation of the plasma being, as just stated, the condition which, according to Henle, immediately determines the agglomeration of the slowly flowing corpuscles and their subsequent stagnation.

§ 43. In the first place it may be doubted whether the serous exudation which accompanies inflammatory congestion, does not really follow instead of precede the stagnation;—certainly determination of blood has already taken place before exudation; and determination, it is to be remarked, is not owing to mere retardation of the flow of blood but also to accumulation of the red corpuscles, from what cause will be seen below. As to the rapid diminution in the quantity of the plasma, observed in the frog at the time of stagnation, it can be more easily supposed to be owing, as above hinted, §17, to its draining off from among the red corpuscles already beginning to aggregate than that the serous part of the plasma should have exuded in such quantity and so suddenly through the walls of the small vessels as to affect the blood flowing through them.

§ 44. The circumstance, otherwise very interesting, deduced by Henle from the analyses of blood drawn in inflammation, published by Andral and Gavarret, and by Simon, viz., that the chemical composition of the exuded serous fluid and of the blood in inflammation, stands in such a reciprocal relation as to show that the change in the blood might be in a great measure owing to the abstraction of the exuded fluid, does not prove that the serous fluid was exuded before the stagnation. And this, because in all the cases the blood analysed must have been drawn in the fully developed stage of the inflammation, and, of course, after stagnation had taken place, and when exudation might well have been subsequent to it.

§ 45. That the change which the blood drawn in the course of inflammation presents, however, is not owing to the mere abstraction of serum, is shown by this, that the red corpuscles are proportionally diminished in quantity instead of being increased as they ought to be, according to Henle's supposition, as to the cause of inspissation of the plasma. It is this diminution of the quantity of the red corpuscles which, according to the author of this Report, accounts for the preponderance of fibrin in the plasma, the red corpuscles having become resolved into it.*

* See the author's observations on the blood in this Review for Oct. 1842. Here the author would beg the reader's indulgence while he makes a few remarks in regard to himself personally. The view that the red corpuscles may be considered as glandular cells first occurred to him independently, but finding, on a reference to the General Anatomy of Professor Henle of Zurich, that that excellent and accomplished physiologist had anticipated him, he immediately sank all pretension to the view. Farther, Dr. Willis, to whom the author of this report had communicated his views regarding the signification of the red corpuscles, finding in Wagner's Physiology, which he has so well translated, a statement to the effect that the red corpuscles might be presumed to bear the same relation to the plasma and its normal composition, as the cells of secreting glands do to the secreted fluids, made it known to the author just as his paper on the blood was about being printed off. This view of Wagner as well as the similar one of Henle the author inserted without any reference to the circumstance that the same view had independently occurred to him. The view, however, that the more peculiar object of the elaboration performed by the red corpuscles, is the conversion of albumen into fibrin, and that the augmentation of fibrin in the blood in inflammation is at the expense of the red corpuscles, they, in consequence of their increased secretory action, being more quickly and in greater quantity, resolved into fibrin than in health, not having been expressed either by Wagner or Henle, he allowed himself to enunciate it as if it were his own. And in this he believes he was justified. Dr. Carpenter, however, in a report in this Review for Jan. 1843, who, it is to be remarked, could have gained his knowledge of the subject only from the author's paper and Willis's translation of Wagner, attributes the view to Wagner and Henle, merely adding the name of the author of this report after theirs. And, as is the fate of statements which pass from one compiler to another, the "Wagner, Henle, and Wharton Jones" of Dr. Carpenter is curtailed by Dr. Williams to "Wagner, Henle, and others!" In regard to all

§ 46. As to the appearances presented by the red corpuscles at the time of aggregation mentioned at §§ 15-17, they are no proof of inspissation of the plasma. Similar appearances are presented by blood after being drawn from the body (§ 5); and when care has been taken to prevent inspissation,—nay when the fibrin has been removed, and the red corpuscles are suspended in the serum merely. Besides inspissation of the plasma by an increase of fibrin, at the same time that it promotes aggregation of the red corpuscles, has a tendency to produce *en*dosmotic rather than *ex*osmotic changes.

§ 47. But suppose serous exudation does occur before stagnation, and consequent inspissation of the plasma,—unless the whole exudation of serum took place at once, it is hard to conceive how the blood in a part, though flowing slowly in the capillaries, could be much affected by it. For the portion of blood, for example, from which serum is being given out will have passed on into the veins before inspissation of its plasma has taken place to a sufficient amount to determine aggregation of its red corpuscles, supposing aggregation to be brought about in this way, and will have been replaced by a new quantity from the arteries.

§ 48. In this way exudation of serum might continue to go on without being followed by aggregation of the red corpuscles, until the plasma of the whole blood in the body became inspissated to the due extent, and then the following difficulty would present itself:—

§ 49. If mere inspissation of the plasma, together with a retarded flow of the blood, were the sole condition for the aggregation of the red corpuscles, and consequent stagnation in the small vessels, why, it may be asked, does not stagnation take place in the small vessels of any part in which the flow of blood is retarded by a bandage or any other means, when, as in acute rheumatism for example, the plasma of the whole blood is much inspissated? And why even do the red corpuscles not aggregate within the small vessels in the healthy and natural state of the plasma, when the course of the blood through these vessels is retarded by any cause, seeing that in blood out of the body the red corpuscles aggregate as well when the plasma is of natural consistence as when it is much inspissated only not so rapidly, though still rapidly enough?

§ 50. Stagnation of the blood must thus acknowledge some other essential cause than inspissation of the plasma. In fact, inspissation of the plasma is not at all under any circumstances the essential condition of the aggregation of the red corpuscles, either without or within the small vessels. When it exists it can merely promote the operation of the essential cause when this is allowed to come into play. This is an important distinction. (§§ 5-15-17-60.)

§ 51. Dismissing from consideration then, as unsatisfactory, the preceding explanations of the stagnation of blood in inflammation, the inquiry presents itself as to *whether stagnation of the blood in inflammation may not be referred to alteration of* powers, influencing the condition and motion of the blood *in the living body, and that independent of any contractions of living solids.**

§ 52. Dr. Alison having narrowed the question as to "whether the phenomena of inflammation can be explained by alteration of the vital powers of the vessels in which the blood moves," down to this, viz., "Does the state of relaxation in which all the vessels are in inflammation afford a sufficient explanation of the changes which take place in inflamed parts?" concludes (p. 121) that "inflammation and its effects are inexplicable by any alteration of the contractile powers of the living solids concerned in it; and necessarily imply an alteration of vital properties, by which the constitution of the blood, its relations to the surrounding textures and its movements through them are determined, but which are quite

this, the author of this report would observe—that perhaps Wagner and Henle would repudiate the view as Dr. Carpenter himself does; if not, when they claim it, the author of this Report will yield it to them; but till then, he protests against the award of Drs. Carpenter and Williams. On an early occasion, the author of this report will meet Dr. Carpenter's objections to the view in question, and inquire into that which Dr. Carpenter proposes to substitute for it.

* Alison, p. 115.

distinct from any contraction of living solids. That such living properties exist (Dr. Alison goes on to say), that they effect the changes taking place at *insensible distances* among the particles of the blood, and that they are altered in inflammation, will hardly be denied by any pathologist. That they are capable of affecting the *visible* motion of the blood will appear a rash assertion only to those who have not accustomed themselves to consider the evidence by which it is supported."

§ 53. The conclusion that Dr. Alison comes to is, that inflammation consists essentially in a local increase of a vital property of attraction existing among the particles of the blood, and between them and the surrounding textures, and with which other vital properties are connected, and simultaneously excited. That the proximate cause of inflammation, although affecting the constitution of the blood, does not reside in blood only, but primarily in the agency on the blood of the solids through which it passes in the capillary vessels, appears clearly from the limitation of the disease to a certain locality in the body, from the fact of its easy reproduction, for a long time or for life, in the vessels which have once been the seat of it.

§ 54. It has been above stated, that according to Vogel, it is only in common congestion that the dilatation of the capillaries is primary, and then it has for its sole effect a retarded flow of blood, and that within narrow limits, not at all a total stagnation. The dilatation of the capillaries in inflammation on the other hand, Vogel thinks is secondary, and owing to mere distension from the accumulated and stagnated blood. He admits, however, that common congestion may precede inflammatory congestion, in which case dilatation of the vessels from relaxation will precede their distension by accumulated and stagnated blood.

§ 55. The cause of the congestion and stagnation of the blood in inflammation, Vogel considers to be a vital attraction betwixt the blood and the parenchyma of a part. This attraction he thinks is exerted in most cases by the parenchyma of the affected part, to which it is communicated either immediately by the exciting cause, or mediately through the nervous system. In other cases, besides depending on a change in the vital force of the parenchyma, the increased attraction depends also on a vital change of the mass of blood.

§ 56. The circumstance that the red corpuscles, from occupying the middle only of the stream, approach the wall of the vessel and completely fill it, Vogel thinks has its natural explanation in the alleged increased attraction between the blood and parenchyma, by which the blood-corpuscles naturally approach the walls of the vessel. The exudation of serum, which always takes place at the same time, and afterwards of plasma, he thinks also contributes by allowing the corpuscles to come closer together, and to the walls of the vessel.

§ 57. The exudation which immediately follows stagnation, Vogel readily explains by the increased attraction. The plasma passes out through the walls of the vessels as through a filter, but the corpuscles are retained.

§ 58. Emmert, entertaining the correct opinion that mere relaxation and dilatation of the vessels cannot suffice in any way to explain stagnation, considers the positive observation of adhesion of the red corpuscles to the walls of the vessels as an indication of the operation of attraction; but, as Henle remarks, there is an attraction of the corpuscles for each other, which cannot be explained by a reciprocal attraction betwixt the blood and parenchyma.

§ 59. Emmert considers the attraction to belong to the corpuscles only, and not like Vogel, in any way to the plasma, which is merely pressed out. Nor does he, like Vogel, admit any difference between inflammation and common congestion, believing that in both cases there is, besides the increased attraction above noticed, dilatation of the vessels.

§ 60. The appearances attending the stagnation of the red corpuscles (described in § 16-17) are such as might be supposed to be the effect of a suspension of the conditions by which, in the natural state, the red corpuscles keep in the middle of the stream, neither adhering to the walls of the vessels nor to each other, and do not readily enter the smallest capillaries; the effect in fact of the establishment of an attraction between the red corpuscles on the one hand and the walls of the vessels on the other, as well as among the red corpuscles themselves, instead of the absence

of attraction or the actual repulsion which naturally exists. But supposing all this —supposing that attraction does come into operation, the question remains, How is the attraction called forth? or what are the conditions on which it immediately depends? or even which attend it?

§ 61. Alison does not enter into this question particularly. He thinks that it is through the intervention of the nervous system that cold applied externally excites inflammation of internal organs; but whether in all cases the exciting cause of inflammation act through the nervous system, he leaves undetermined. Amongst other objections which he mentions might be urged against this, is the fact, to be more fully noticed below, that inflammation occurs in an organ the nerves of which have been cut. This, however, as will be immediately seen, is no proof that it is not through the nervous system that the exciting cause of inflammation acts, for it may be not the presence but the absence of nervous influence which is the necessary condition.

§ 62. According to Vogel the attraction is owing to "nervous agency;" or to the immediate action of the exciting cause on the parenchyma, together with, though in some cases only, a change in the blood.

§ 63. Leaving out of view a pre-existing change in the blood, as it in any case can only be accessory not essential to stagnation, it may be asked how does the nervous influence, in comparison with its ordinary and natural operation, act in communicating the attraction for the blood to the parenchyma? is it by being discharged upon the parenchyma in increased quantity, or by being altogether withdrawn from it? Again, how does the exciting cause of inflammation, say mechanical or chemical injury, by its immediate action on the parenchyma, call forth an increased attraction in it for the blood?

§ 64. Without some sort of answer to these questions, the proposition that there is a vital attraction between the blood and parenchyma does not amount to much more than the mere statement of the fact that stagnation takes place in the manner above mentioned.

§ 65. Though he does not attempt any answer to these questions, Emmert goes farther in the way of explanation than Vogel, inasmuch as he points out some of the conditions attending the operation of the attraction. Thus he points out that constriction of the capillaries (small arteries) and attraction between the parenchyma and blood-corpuscles are in antagonism. That when the constriction of the capillaries is *great*, the attraction between the parenchyma and blood is *small*, hence there is no congestion. When, on the contrary, there is *relaxation and dilatation* of the capillaries, there is *great attraction* between the parenchyma and blood: the consequence of which is accumulation and stagnation of red corpuscles.

The indication of these relations is a very important step towards the explanation of the cause of stagnation.

§ 66. It thus appears that the advocates of the attraction-theory, as Henle calls it, have not fully made out their case, in as far as concerns the conditions on which the attraction between the corpuscles and the walls of the vessels, and among the corpuscles themselves depends.

§ 67. Though, as above shown, Henle has not succeeded in giving a satisfactory explanation of the proximate cause of the stagnation of the blood; he has contributed much as regards the theory of inflammation, in tracing how the exciting cause operates in determining the relaxation of the walls of the vessels, with consequent dilatation of their caliber.

§ 68. According to the theory which Henle supports and which he calls neuro-pathological, it is through the nervous system that the exciting cause of inflammation operates, and this, as is also ingeniously argued by Dr. Billing,* by suspending the nervous influence from the small vessels, and consequently determining relaxation of their walls with dilatation of their caliber. To secure a basis for this

* First Principles of Medicine, 4th edition, p. 29. Dr. Billing's explanation of the mode in which congestion is brought about is this: In consequence of exhaustion of the nervous influence, the capillaries become weakened, and allow of over-distension by the ordinary injecting force of the heart, and the part is thus in the state of inflammation or congestion.

theory, Henle enters into a disquisition proving the dependence of the contractility of the vessels on nervous influence. But as this question cannot at present be entered on, reference may be made to Henle's General Anatomy, and to his Report. See also Wagner's Physiology and Billing's Principles of Medicine.

§ 69. Though in answer to the question (§ 33) whether the phenomena of inflammation can be explained by alteration of the vital powers of the vessels in which the blood moves, as narrowed by Dr. Alison down to this—" Does the state of relaxation in which all the vessels are in inflammation afford a sufficient explanation of the changes which take place in inflamed parts?" the same negative conclusion may be come to with Dr. Alison, viz. (§ 52,) that inflammation and its effects are inexplicable by any (mere) alteration of the contractile powers of the living solids concerned in it; still the question may not be so narrowed, and reason may be seen to admit that though mere relaxation does not afford a sufficient explanation of the changes which take place in inflamed parts, the condition on which the relaxation depends may also be the condition of the changes, viz. suspension of nervous influence. Hence, relaxation, though not a cause of, would be coincident with, the changes, and even play a certain part. The relations above referred to (§ 65) as pointed out by Emmert, speak strongly for this coincidence.

§ 70. Preliminary to entering upon an exposition of the theory which appears to the author of this Report to harmonize most completely with all the facts of the case, he postulates the following propositions, delaying what proofs may further be required to support them, in addition to such as have been already adduced or will be adduced further on, until another occasion, when it is proposed to consider the whole subject of contractility and its dependence on nervous influence.

1st. That the constriction and dilatation of the caliber of the small arteries at least, if not of the capillaries, is owing to contraction and relaxation of their walls by virtue of the vital endowment of contractility or tonicity which they possess; the exercise of which contractility is dependent on nervous influence.

2d. That the constant moderate exercise of this endowment on which the ordinary state of tone of the vessels depends, is determined by the constant moderate discharge of nervous influence.

3d. That whilst a greater state of contraction of the vessels than ordinary is owing to an increased discharge of nervous influence, the relaxation, atony, or paralysis of the walls of the vessels on which their dilatation depends, is owing to the suspension of nervous influence.

4th. That the relaxation with dilatation of the vessels from suspension of nervous influence, is the precursor of the retarded flow of blood and stagnation.

§ 71. How the suspension of nervous influence from the walls of the small arteries on which their dilatation depends is produced, involves the question of the mode of operation of the exciting cause of inflammation. To this, as already promised, attention will by and by be directed. At present, inquiry has to be made how the suspension of nervous influence from the small arteries and the consequent relaxation and dilatation of these vessels are connected with the retardation of the flow of blood and subsequent stagnation.

§ 72. In entering upon this inquiry, the author of this Report has, in the first place, to remark that it appears evident that the agglomeration of the red corpuscles of newly abstracted blood is owing to their being withdrawn from some influence under which they were while in the body, an influence which keeps down the tendency to aggregate.

§ 73. The circumstance that the red corpuscles of extravasated blood aggregate shows that that influence is exerted on the blood, not in any part of the body, but only while within the vessels. But the circumstance that the red corpuscles do aggregate in inflammation within the vessels shows that the influence here spoken of may cease to be exerted on the blood even there.

§ 74. Now it has been seen that it is not when the vessels are constricted, and consequently when they are receiving nervous influence, but when they are dilated and when consequently there is a suspension of nervous influence from them that aggregation of the red corpuscles and consequent stagnation of blood takes place

in the capillaries. The natural inference from this is that the influence which keeps down the tendency of the red corpuscles to aggregate is communicated to them by the nerves accompanying the small vessels, arteries as well as capillaries, as the blood passes through.

§ 75. When then the nervous influence is withdrawn from the small arteries, and they have in consequence become relaxed and dilated, and when any nervous influence which may naturally be discharged on the capillaries is from the same cause withdrawn, the blood slowly flows through the dilated small arteries into the capillaries as into an indifferent cavity and in the same condition as regards tendency of the red corpuscles to aggregate as blood is when newly drawn from the body, or when extravasated, as well as with the same change in appearance. §§ 5-15-17-60-65.

§ 76. Aggregation of the red corpuscles accordingly takes place, some at the same time adhering to the walls of the vessels. This latter phenomenon is to be attributed in like manner to the suspension of nervous influence from the small vessels. For it is to be observed that the circumstance of the red corpuscles keeping together in the axis of the stream, and aloof from the walls of the vessels in the natural state of the circulation may be accounted for with Mr. Martyn Roberts* by the nervous influence, annulling the attraction of adhesion, or causing a repulsion between the red corpuscles and walls of the vessels at the same time that it does so among the red corpuscles themselves. The suspension of the repulsion between the red corpuscles and walls of the vessels also allows the entrance of red corpuscles in numbers, into the very small vessels into which they before occasionally, and few in number only entered. (§ 10.)

§ 77. The retarded flow of blood which precedes the stagnation, and which, according to Henle, is wholly the physical effect of the dilatation of the paralysed vessels, can be admitted to be so in part only, being greater than the dilatation appears physically to account for. The other cause appears, from what has been above said, to be the commencing attraction among, and agglomeration of the red corpuscles, as also the commencing attraction between them and the walls of vessels. By the dilatation of the vessels, retardation of the flow of blood as a whole, as a fluid is determined; the additional retardation by the commencing attraction, affects the corpuscles only, hence their accumulation in increased quantity while the plasma passes on.†

§ 78. As the retardation of the flow of blood accompanying relaxation and dilatation of the vessels is not alone owing to that dilatation, so on the other hand, the accelerated flow of blood which accompanies constriction of the vessels is not alone owing to that constriction, but in part to diminished attraction, or actual repulsion. The increased discharge of nervous influence which determines the contraction of the walls of the vessels, at the same time calls forth diminished attraction or actual repulsion between the walls of the vessels and the red corpuscles, as well as among the red corpuscles themselves.

§ 79. The view of the process leading to inflammatory congestion which has now been laid before the reader, explains why when, in inflammatory fever, the plasma of the blood in general is much inspissated, and the tendency of the red corpuscles to aggregate when the blood is withdrawn from the body, consequently increased, stagnation does not occur in any set of capillaries in which the flow of blood may be retarded. The nervous influence which continues still to be expended on the small arteries of the part, prevents it by keeping down the tendency of the red corpuscles to aggregate; mere inspissation of the plasma as above shown not being the essential, but merely a promoting condition for the aggregation of the red corpuscles.

§ 80. But of course if in a case in which the plasma is much inspissated, irritation be applied, and relaxation or paralysis and dilatation of the small vessels of

* On the Analogy between the Phenomena of the Electric and Nervous Influences; in the London, Edinburgh, and Dublin Philosophical Magazine for July, 1841.

† Emmert observed that when the crural vein of the frog was tied, the blood, which was in consequence stagnated in the capillaries, presented an equal proportion of plasma and corpuscles.

the part be produced, and consequently the influence keeping down the tendency of the red corpuscles to aggregate be withdrawn, stagnation of the blood will take place with proportionally increased readiness. Inspissated plasma, as above shown, § 50, acting as a promovent of the aggregation, though not itself the essential cause.

§ 81. The view further explains why, when congestion is owing merely to an impediment to the flow of blood in the veins of the part, the red corpuscles do not adhere to each other, and to the walls of the vessels as in true inflammatory congestion.

§ 82. Amidst the obstructed vessels as above mentioned, § 12, a few here and there may still be seen pervious, and through them the mass of blood is directed off in accelerated streams, just as the water of a river would be, if obstructed, by other channels leading from the main channel above the place of obstruction.

The acceleration of the stream of blood is the necessary physical result of the contraction of its aggregate channel.

This indicates that all the nerves of the vessels of the part are not affected. Were all affected there would be mortification of the part. The different forms of inflammation of which a part is susceptible are probably in part owing to a difference in the extent to which the nerves of its vessels are affected.

V. MODE OF ACTION OF THE EXCITING CAUSE OF INFLAMMATION.

§ 83. That the exciting cause of inflammation acts through the nervous system had been supposed by many, and indeed acknowledged as certain in the case of inflammation of internal organs from cold, but no detailed explanation was attempted of the nature of the part which the nervous system plays until recently. For this pathology is indebted to Henle* and Stilling.†

§ 84. Before going into the subject with Henle and Stilling, it will be proper to notice briefly the opinions of Drs. Macartney, Copland, and Billing.

Granting that increase of blood in a part is an evidence of increased vital power, and vice versâ, it does not follow that the means by which the increase of blood in the part is brought about is increased action of all parts concerned. The action of one part may relax in order to give effect to the action of another. Dr. Macartney not thinking so, and recognizing dilatation of the vessels as a condition of inflammatory congestion, supposed, as above mentioned, that this dilatation of the vessels is a state of activity though one of quite an opposite nature to that of muscle. Instead therefore of a suspension of nervous influence from the small vessels as above admitted, § 68, et seq. Dr. Macartney maintains that there is increased nervous energy. His explanation of how the exciting cause of inflammation operates through the nervous system is in accordance with this, and is consequently quite the opposite of the view to be explained below—in fact so much so, that if read reversed, it would be nearly that to which the reader's attention is about to be directed.

According to Dr. Copland, (who first promulgated his views on inflammation many years ago,) in sthenic inflammations, organic nervous influence, and vascular action, are not only primarily increased, but also otherwise changed. Dr. Copland's views regarding asthenic inflammation, are more in accordance with what is maintained in this Report, as to inflammation generally.

Dr. Billing, as above shown, (§ 68,) maintains the view that inflammation is primarily owing to exhaustion of the nervous influence, which gives the capillaries power. This exhaustion is produced by continued excitation of the nerves.

§ 85. Though explaining differently its mode of action, the author of this Report has above recognized with Billing and Henle, as the essential condition of stagnation of the blood in inflammation, suspension of nervous influence from the small vessels with consequent relaxation of their coats, and dilatation of their caliber.

* Pathologische Untersuchungen, 1840, and also 'Bericht,' ut supra.

† Physiologische, pathologische und medicinisch-praktische Untersuchungen über die Spinal-irritation, 1840.

An inquiry how the exciting cause of inflammation operates in producing this suspension of nervous influence now claims attention.

§ 86. The theory which Henle, by his physiological investigation of the subject, has been led to form of the mode of action of the exciting cause of inflammation, in determining the suspension of nervous influence from the small vessels on which their relaxation and dilatation depend, is this:

The exciting cause, of what nature soever it may be, whether external or internal, acts primarily on sensitive nerves, exalting their activity. The motor nerves of the vessels which have sympathetical relations with the excited sensitive nerves, are secondarily affected. But this affection of the motor nerves of the vessels, which supervenes by reflex action on the excitement of the sensitive nerve, is not a corresponding state of excitement, but an opposite one of depression, of suspension of action, of paralysis.

§ 87. This form of sympathy, in which the state of excitement of one nerve determines depression of another, Henle calls *antagonism;* the name of *sympathy* in a restricted sense being retained for that form in which a state of activity of one nerve is called forth by a corresponding state of another. This latter form is more common in the domain of the cerebro-spinal system; the former in the domain of the ganglionic system, the source of the nerves of the vessels.

§ 88. Sometimes, however, sympathy is exemplified in the vessels by constriction supervening on irritation and preceding dilatation. But in most cases relaxation and dilatation of the vessels from suspension of nervous influences, are the primary effect of the irritation, no matter whether that irritation have been violent or moderate. Hence Henle contends that the relaxation of the vessels on which their dilatation depends cannot be a mere consequence of exhaustion of the vessels from previous action, as has been suggested by Alison (p. 117) and Billing, but can only be antagonistic. Into this, however, it is not necessary to enter; for, provided suspension of nervous influence and consequent dilatation of the vessels, do take place, it is indifferent for the theory of the proximate cause of inflammation above expounded whether that state of the vessels be the result of antagonism or of exhaustion succeeding a state of activity induced by sympathy.

§ 89. Inflammation excited by exposure to cold often affects some part other than that to which the cold was immediately applied. In such a case it may be said *hic stimulus, ibi fluxus*, but in most cases of external, traumatic inflammation which come under notice, the congestion occurs at the place where the irritation was applied, *ubi stimulus, ibi fluxus.* Hence the widely-spread belief that the irritation affects the vessels directly; but to say nothing of physiological examples of reflexion on remote vessels, *hic stimulus, ibi fluxus*, which may be adduced in contradiction of the belief referred to, such for example as the circumstance, that irritation of the conjunctiva, or of the mucous membrane of the nose, excites the congestion in the lacrymal gland on which the discharge of tears, resulting from the irritation depends, a pathological one, in various ways more instructive, will be adduced below in the inflammatory congestion of the conjunctiva and sclerotica which supervenes on a wound of the cornea.

VI. EXPLANATION OF THE OCCURRENCE OF INFLAMMATION OF A PART AFTER SECTION OR DISEASE OF ITS NERVES.

§ 90. In those cases in which inflammation of an organ occurs after section of some part of the sympathetic system—of the eye for example after section of the sympathetic in the neck, as also in those cases in which inflammation of the eye supervened, on section of the fifth pair, and of the lungs and stomach on section of the par vagum—the inflammation was at first attributed to the suspension of some peculiar influence supposed to be exerted by the nerves over the nutritive processes. Dr. Alison, however, combated the opinion that the nutritive processes are in any direct manner under nervous influence. And in regard to the cases in which inflammation of the eye, lungs, and stomach supervened on section of their nerves, supposing that these nerves are wholly sensitive, he suggested that the inflammation, instead of being a direct effect of their section, might rather

be an indirect result of the suspension of sensation produced by the section; and in this way: He supposed that due secretion on the surface of the mucous membranes implicated is determined by the exigencies of the part in this respect being made known as it were by the sensitive nerves. These nerves being cut, the secretion becomes diminished and altered, the consequence of which is that irritation by foreign matters is allowed to operate to an extent to excite inflammation. Dr. Alison does not offer any explanation of the occurrence of inflammation of an organ after section of some part of the sympathetic.

§ 91. The progress of physiology has confirmed Dr. Alison's opinion as to the immediate non-dependence of the nutritive processes on the nervous system. Nerves act indirectly only, and that by virtue simply of their ordinary sensiferous and motiferous endowments. Even the sympathetic as first declared by Stilling, acts in no other way. And why it appears to be more particularly the nerve governing nutrition is explained by the circumstance that it is the principal source of the nerves of vessels.

§ 92. In regard to inflammation of an organ occurring after section of some part of the sympathetic, Stilling declares it to be owing simply to paralysis of the walls of the vessels, from section of the source whence their motor nerves are derived. And this, taken in conjunction with the theory of the proximate cause of inflammation above enunciated, appears to be the true and natural explanation.

§ 93. The inflammation of the eye after section of the fifth pair, and of the lungs and stomach after section of the par vagum, Stilling declares to be the effect of paralysis also, but determined in the following indirect manner:—He supposes that a reflex action from sensitive nerves to the nerves of vessels is constantly going on, and is a necessary condition of the activity of the vessels. When, therefore, the sensitive nerves are cut, a suspension of this reflex action takes place; the consequence of which is paralysis of the nerves of the vessels.

§ 94. Henle objects to this view of Stilling,—and the objection is also applicable to Alison's,—that were the integrity of sensitive nerves a *conditio sine qua non* for the normal function of the vessels, the loss of sensibility must in every case be followed by stagnation of the circulation; which is not the case, for there are anæsthesiæ in which the circulation in the part goes on; when the nerves of the leg of the frog are cut, for example, the circulation nevertheless continues.

§ 95. According to Henle, the stagnation of blood which takes place after section of sensitive nerves, the fifth pair, the par vagum, &c., belongs to a category with those which occur after section of branches of the sympathetic. It must only be granted that the sympathetic or nerves of vessels are mixed with those so-called sensitive nerves. There are in favour of this, not only anatomical facts, such as the passing of branches from the spheno-palatine ganglia to the twigs of the trigeminus, but also physiological analogies; viz., the collection of other motor nerves, e.g. for the pharynx, gullet, and respiratory organs, in the trunk of the *vagus*. In paralysis of these nerves, from affection of their central ends, the nerves of the vessels are not necessarily implicated, and therefore remain active;* in the section of the nerves of the extremities, in Hausmann's cases, they were not injured, because they accompany the vessels.

§ 96. In like manner, the continuance of the circulation in the frog's leg after section of its nervous trunks is, perhaps, owing to the nerves of the vessels not being included in the trunks, and therefore not implicated in the section. But when the source of these nerves is implicated, the circulation in the small vessels is affected, as shown by the experiments of Flourens and Baumgärtner, in which injury of the spinal cord affected the flow of blood in the capillaries.

§ 97. According to Magendie, the inflammatory symptoms in the eye are more violent after section of the first branch of the fifth than after the section of the trunk above the ganglion of Gasser. This fact, which is inexplicable according to Stilling's view, is, Henle thinks, easily intelligible according to his;—for in the first

* See also Macartney on Inflammation, p. 133.

case, all the nerves of the vessels, including those contributed by the sympathetic, are cut; in the second case, probably only a small number, which are from the first mingled with the trigeminus.

§ 98. The readiness with which inflammation may be excited by slight irritation in paralysed limbs, may be collated with the readiness with which reflex action occurs in the same limbs. As slight irritation calls forth by reflexion contraction of the muscles (sympathy), so a similarly slight irritation calls forth by reflexion relaxation of the vessels (antagonism.)

§ 99. The inflammation which sometimes accompanies spinal irritation, or neuralgia, Stilling explains in the same way as he does that which results from the section of the fifth pair for instance, he supposing that in neuralgia the sensitive nerves are in a state of paralysis. Henle maintains the opposite, and explains the inflammation on the principle of antagonism above mentioned, thus:—Neuralgia being a state of excitement of a sensitive nerve, determines antagonistic paralysis of the motor nerves of the vessels of the part, whence relaxation of their walls and dilatation of their caliber.

§ 100. In the preceding part of this Report, where the immediate cause of the stagnation of the blood in inflammation is under discussion, no reference is made to Stilling's views on the subject. Here it may be mentioned, that in addition to the set of cases above considered; viz., 1st, those occurring after section of the sympathetic; 2d, those occurring after section of sensitive nerves; and 3d, those accompanying spinal irritation; in which he says that there is paralysis of the nerves and relaxation and dilatation of the vessels; he admits another set of cases—traumatic—in which, on the contrary, there is constriction of the vessels in consequence of increased action of their motor nerves, determined from reflexion, from increased excitement of the sensitive nerves. He does not, however, attempt any detailed explanation of how the paralysis of the nerves and relaxation and dilatation of the vessels, in the one case, or the excitement of the nerves and constriction of the vessels, in the other, determine the stagnation. In the latter case, in particular, he makes no use of the alleged increased tone of the vessels in giving an explanation of the cause of the stagnation of the blood, but ascribes it to a morbid condition of the blood; thus, as Henle remarks, giving up his own principle, that the cause of inflammation operates through the nervous system, and calling into his aid a humoral pathological theory exactly in cases in which a change of the humours is least probable.

VII. EXUDATION.

§ 101. Immediately after or during the stagnation of the blood, exudation commences. From being at first serous the exuded fluid comes at last to be pure plasma, or at least a fluid containing a greater or less quantity of fibrin.

§ 102. The exudation may, in the aggregate, be attributed to the thinning of the walls of the vessels, from their relaxation and dilatation on the one hand, and the pressure from within the vessels on the other. Besides these, another condition suggests itself as likely to promote exudation, viz., the circumstance that the plasma will be pressed out from among the aggregating corpuscles, even when the blood would not, if out of the body, present the buffy coat, and that because within the body the fibrin of the plasma does not so readily coagulate.

§ 103. When, however, the mass of blood has already become changed to that condition in which the buffy coat would present itself were the blood drawn from the body, the plasma, at the same time that it is more quickly and energetically squeezed out from among the aggregating red corpuscles, will present itself in greater quantity and richer in fibrin, for transudation through the walls of the capillaries.

§ 104. The question, however, occurs, why does serum alone pass out first? The author of this Report thinks, with Dr. Watson, (Lectures on the Practice of Physic, vol. i, p. 155,) that it is, as in common œdema, owing to obstruction; the obstruction in inflammation being from the stagnation of the blood. But how obstruction determines exudation of serum alone, remains a question. To help

to a solution of this, it may be stated that, according to Kürschner, water passes most quickly through animal membranes, and saline solutions more quickly than viscid, gummy, and albuminous solutions.

§ 105. None of the corpuscles of the blood pass out along with the exuded fluid as long as the vessels are entire. But it is often observed that at certain points the walls of the vessels in which the blood was stagnated, have given way, and permitted an extravasation of both red and colourless corpuscles.

§ 106. With exudation is completed the inflammatory process, properly so called.

VIII. INFLAMMATION OF NON-VASCULAR PARTS.

§ 107. In certain non-vascular parts morbid actions may go on in all respects similar to those which usually attend or result from inflammation. The cornea, for example, though it is vascular whilst being developed, is, in its fully formed and healthy state, non-vascular; and yet inflammation of the cornea is spoken of.

§ 108. The cornea, there is reason to believe, derives the materials necessary for its nutrition from the blood circulating in the vessels of the adjoining parts of the conjunctiva and sclerotica. Let it be inquired what takes place in the cornea when there is applied to it such an irritation as would excite inflammation in one of the vascular parts of the eye.

§ 109. When the cornea is injured then, congestion of the vessels, of the adjoining parts of the conjunctiva and sclerotica takes place, and exudation into the substance of the cornea by and by ensues. Thus, though non-vascular, and of course not the seat of inflammatory congestion, it becomes the seat of a very important part of the inflammatory process—the most important part, perhaps, as regards the events of the process.

§ 110. The cornea in this state may therefore be said to be, to all intents and purposes, inflamed—the only difference in respect to it, as compared with vascular parts, being that the vascular congestion is *not in it*, but *in adjoining structures*.

§ 111. On the other hand, it is to be remarked, that although these adjoining structures are the seat of the congestion, little or no exudation may take place in them or on them, and they may therefore be said scarcely or not at all to be the seat of inflammation as regards the events of the process. When the conjunctiva and sclerotica are really inflamed, exudation in or on them may occur; but then the congestion is different in seat and extent from what it is in the former case, and there may be no exudation into the cornea—the cornea may remain unaffected.

§ 112. In the progress of inflammation of the cornea, this structure may become vascular, but such an event is owing to the development of new vessels, such as happens in inflammation of vascular parts, and as will be considered on another occasion.

§ 113. Though inflammation of the cornea considered as a non-vascular part, has been thus dwelt on, the truth is that all tissues as regards their component elements are properly speaking non-vascular, and differ from the cornea, only in degree of proximity to the vessels, and therefore in inflammation only in degree of the proximity to the source of the exudation.

§ 114. But this very difference presents a natural analysis of the inflammatory process. It enables one to observe separately, the two great stages of inflammation proper, the *congestion* and the *exudation*,—the congestion in one place, the exudation in another. It also enables one to observe, as will be shown on another occasion, in an uncomplicated manner, the eventual stages of inflammation, such as reorganization and suppuration. Lastly and especially, it enables one to analyse the mode in which the inflammatory irritation is communicated to the vessels, in other words, the mode of action of the exciting cause.

§ 115. In what is ordinarily called a vascular part, the irritation, for aught that could be said to the contrary, except by a round about process of reasoning as above seen, might act directly on the vessels as some maintain, but in the case of irritation applied to the cornea alone, and not either to the conjunctiva or sclerotica,

it cannot do so. And for the very simple reason that there are no vessels in it to be acted on. The vessels which are affected are those of the conjunctiva and sclerotica.

§ 116. The mode in which these vessels are affected in consequence of irritation applied to the cornea alone appears to be this: Excitement of the sensitive nerves of the cornea, (for the cornea has nerves, though no vessels, as at first shown by Schlemm, and since found by Valentin, Pappenheim, and others,) calls forth antagonistically, according to Henle's principle, a state of depression, a temporary paralysis of the motor nerves of the contractile fibres of the walls of the small arteries opening into the capillary network of the conjunctiva and sclerotica, adjoining the cornea. The consequence of this is first relaxation and dilatation of those arteries, and then accumulation and stagnation of blood in the capillaries in the manner already explained.

In the foregoing Report, no reference has been made to Mr. Travers's recent work on Inflammation, as it is principally occupied with the events of inflammation and the healing process. There is indeed nothing in it on *the theory of inflammation proper*, beyond the statement of the fact of stagnation of the blood in the vessels, and the effusion or exudation contingent on it.

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